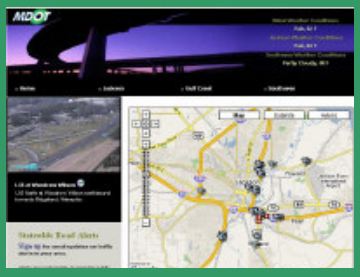

Mississippi Statewide Intelligent Transportation Systems Architecture

MDOT-ITS 002-01-001

Version 2.1

Prepared by:

URS Corporation
Gresham, Smith and Partners, MS, P.C.

November 2008

FHWA
MISSISSIPPI
DIVISION OFFICE

MISSISSIPPI STATEWIDE INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Version 2.1

FINAL REPORT

Prepared for:

Prepared by:

URS Corporation
Gresham, Smith and Partners, MS, P.C.

November 2008

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EXECUTIVE SUMMARY

The Mississippi Statewide Intelligent Transportation Systems (ITS) Architecture is a roadmap for intelligent transportation systems deployment and integration in the state of Mississippi.

An ITS architecture describes the "big picture" for ITS deployment in terms of individual components (i.e. subsystems) that will perform the functions necessary to deliver the desired needs. An ITS architecture supports effective and efficient deployment of transportation and ITS projects that address the transportation problems and needs. The Mississippi Department of Transportation (MDOT) developed the initial Mississippi Statewide ITS Architecture as a component of the MDOT ITS Strategic Plan in 2002. The Statewide ITS Architecture has served as a framework for the planning, deployment, integration, and operation of ITS projects and systems throughout the state.

The existing Mississippi Statewide ITS Architecture was developed based upon version 3.0 of National ITS Architecture. Since the development of the initial Statewide ITS Architecture, however, the National ITS Architecture has evolved to version 5.1 and significant changes have been made. This revision is needed to ensure that the Mississippi Statewide ITS Architecture complies with the latest version of National ITS Architecture. Also, the existing Mississippi Statewide ITS Architecture needs to be updated to reflect the ITS investments in Mississippi since 2002 and meet the evolving ITS needs and services in the state and regions.

MISSION, GOALS AND OBJECTIVES

MDOT's ITS Mission, as stated in the original Statewide ITS Strategic Plan, is:

> ***"MDOT will use ITS technologies to improve the quality of life for State residents and visitors by providing more reliable, informative, safer, and flexible passenger and freight multi-modal transportation services."***[1]

The Mississippi Statewide ITS Architecture is developed to be an open and integrated ITS architecture that is compliant with the Federal Highway Administration (FHWA) Final Rule and Federal Transit Administration (FTA) Policy on ITS Architecture and Standards. The updated Statewide ITS Architecture will support existing and future ITS projects throughout the state and establish baseline for the development of other regional ITS architectures within Mississippi.

In developing the Mississippi Statewide ITS Architecture, it is important to consider the goals and objectives of stakeholders. The architecture serves as a planning tool for the region it is intended to cover. That is to say, the Statewide ITS Architecture addresses ITS goals and objectives on a broader level than a regional architecture, which would recommend specific projects for deployment within that region. The goals for the Mississippi Statewide ITS Architecture were set forth in the original Statewide ITS Strategic Plan, and are as follows:

[1] Mississippi Department of Transportation ITS Strategic Plan, 2002.

- Provide more timely and useful traveler information;
- Enhance motorist safety;
- Improve hurricane evacuation coordination;
- Provide more effective incident management; and
- Manage traffic during and after construction activities.

While these goals do not provide specific details regarding the deployment of local or regional ITS projects, they do outline the general requirements necessary to implement a successful statewide ITS program. It is from these goals that future regional ITS architectures will be developed.

Eight objectives were established as a means towards realization of the mission statement above:

- Establish an ITS architecture that: is open, receptive and adaptable; is consistent with developing national standards; provides opportunities for private/public partnerships; and encourages and supports interagency cooperation;
- Develop and integrate traveler information, traffic management, transit management, maintenance and construction management, emergency management systems, commercial vehicle operations, archived data management and electronic payment throughout Mississippi as appropriate.
- Define how information is collected, processed, distributed and disseminated.
- Define interfaces and information flow among/between subsystems, agencies, and users.
- Support transportation planning process for ITS projects for the DOT and MPOs;
- Support development of strategies and actions in planning process that lead to an integrated, efficient multi-modal transportation system;
- Support development of ITS projects;
- Assist in developing, prioritizing, and addressing consistency of proposed transportation investment;

DESCRIPTION OF THE REGION

The region covered by the Mississippi Statewide ITS Architecture is the geographical areas within the state of Mississippi that are not covered under the four regional ITS architectures. The four regional architectures are the Gulf Coast Regional Architecture, the Central Mississippi Regional Architecture, the Hattiesburg Regional Architecture and the Northwest Mississippi Regional Architecture. The Mississippi Statewide Architecture will serve as a framework for ensuring compatibility and interoperability among the four regional architectures developed separately from this document. The areas covered by the Statewide Architecture are primarily rural areas with small to medium size cities where a regional architecture would not be practical. All ITS projects developed within the State of Mississippi (except for the geographical areas covered under the four regional architectures) would be covered under this statewide architecture regardless of which agency was installing the ITS project.

The Mississippi Statewide ITS Architecture covers services across a broad range of ITS, including traffic management, public transportation, traveler information, commercial vehicle

operations, emergency management, maintenance and construction management, archived data management, and electronic payment.

The timeframe considered for the Mississippi Statewide ITS Architecture is a 20-year vision for ITS activities in Mississippi.

ARCHITECTURE DEVELOPMENT PROCESS

The process for updating the Mississippi Statewide ITS Architecture is based on the National ITS Architecture developed by the United States Department of Transportation (USDOT). Compliance with the National Architecture is mandatory, as part of Final Rule 940 published by the FHWA and FTA on January 8, 2001 for receiving Federal funds for ITS projects. By taking advantage of the USDOT's National ITS Architecture and developing a Statewide ITS Architecture that is consistent with the National ITS Architecture, the state will be able to secure federal funding for ITS projects as well as take advantage of consistent standards and a growing supplier/vendor market for ITS products and services. As transportation systems become increasingly complex, it is important to ensure that the ITS systems deployed within a state or region are compatible and can be integrated with one another. This, in turn, promotes the use of common standards and facilitates the expansion of ITS systems, which will lead to national compatibility of ITS systems.

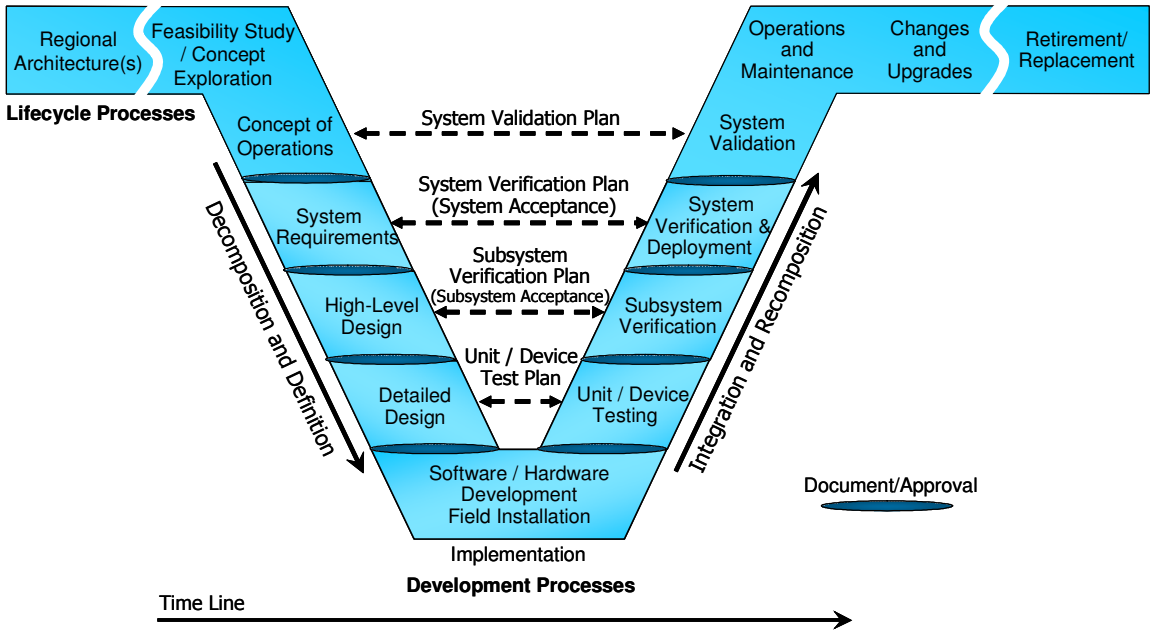
The update of the Statewide ITS Architecture begins with the re-identification of stakeholders and their needs. The objective of identifying stakeholders is to identify and engage stakeholders that own or operate ITS systems and other agencies that have an interest in the transportation issues within the State of Mississippi. Information on existing and planned ITS projects within the state was collected through a comprehensive stakeholder survey and literature review. The survey results were then compiled and used as the "foundation" of the Mississippi Statewide ITS Architecture.

A series of stakeholder meetings was held throughout the state in July and September 2006. Stakeholders from the MDOT, Mississippi Highway Patrol (MHP), City/County Traffic Engineering, law enforcement, transit, planning, and other agencies attended one of four meetings held in Batesville, Hattiesburg, and Jackson. During these meetings, the attendees were given an overview of the Statewide ITS Architecture project and the National ITS Architecture effort, and common themes and user needs were addressed on a statewide basis.

As illustrated in the Systems Engineering Approach recommended by the FHWA, an ITS architecture provides a starting point for systems engineering analyses that are performed during ITS project development. The ITS architecture is a dynamic document that requires periodic updates to reflect changes in an agency's ITS program due to funding levels, evolving project or system requirements, or the introduction of improved technology. Once ITS projects are programmed, the ITS architecture provides initial inputs to support the systems engineering process including the establishment of the concept of operations, requirements, and high-level design and test planning of ITS projects. The ITS architecture improves continuity across the project lifecycle, from planning through project development and operations. As required by the FHWA, the Statewide ITS Architecture serves to meet the criteria of Final Rule 940. Final Rule

940 requires that all ITS projects funded with highway trust funds be developed based on a systems engineering analysis.

It should be noted that the Statewide ITS Architecture should not be considered as the singular architecture for all information flows and communications among the various stakeholders in the state of Mississippi. ITS projects within the state that are outside the Statewide ITS Architecture exist, and they may be included in other regional ITS architectures developed by the Metropolitan Planning Organizations (MPOs).



Systems Engineering Approach

OPERATIONAL CONCEPT

The Statewide ITS Architecture is intended to facilitate data sharing and cooperative control among ITS subsystems throughout Mississippi. The architecture defines an operational concept that describes each stakeholder's current and future roles and responsibilities in the implementation and operation of ITS systems in Mississippi. The architecture describes and categorizes the stakeholders' roles and responsibilities in eleven transportation service areas. These transportation service areas provide general classifications of what functions the participating agencies are providing or will provide. The eleven transportation service areas are:

- Archived data management
- Commercial vehicle operations
- Electronic payment
- Emergency management
- Incident management
- Maintenance and construction management
- Parking management

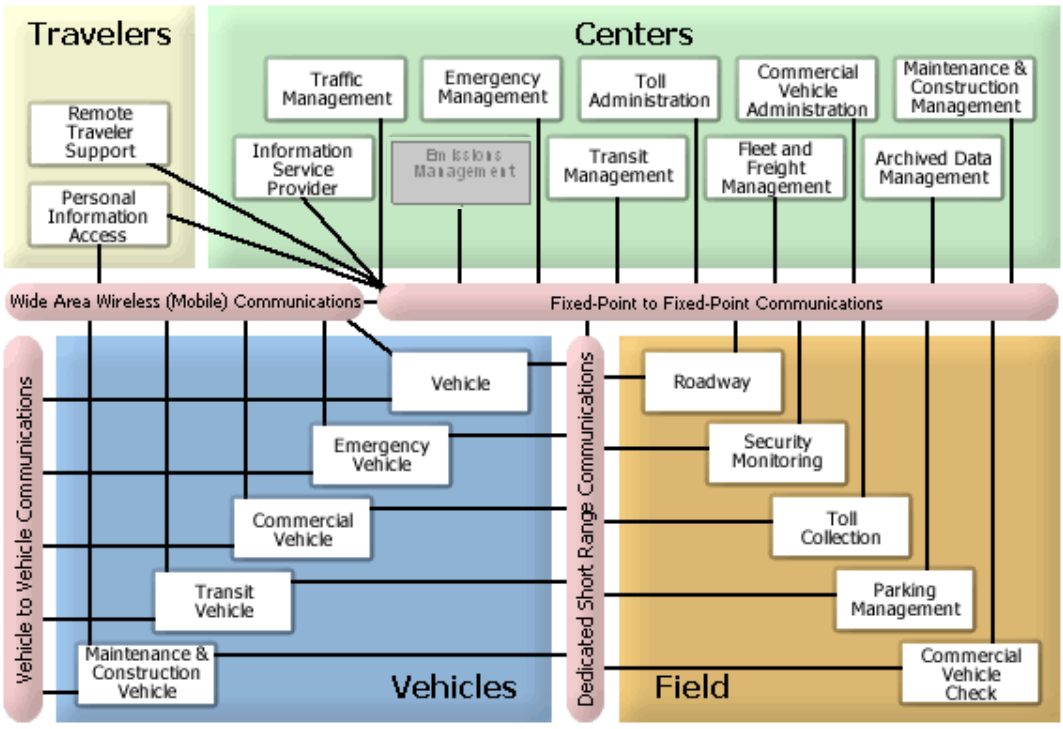
- Public transportation
- Traffic management
- Traveler information
- Transportation planning and architecture maintenance.

STATEWIDE ITS ARCHITECTURE

The Statewide ITS Architecture describes coordination of overall system operations by defining interfaces between equipment and systems which have been or will be deployed by different organizational or operating agencies throughout the state. The architecture identifies the current ITS deployment and how these systems interact and integrate with each other. It also builds on the existing systems and addresses the additional components deemed necessary to grow the ITS systems in Mississippi over the next 20 years to accommodate specific needs and issues of participating stakeholders.

A high-level interconnect diagram for the Statewide ITS Architecture, often referred to as a "sausage diagram" as shown below, illustrates the architecture subsystems and primary types of interconnections (or communications) between these subsystems. The sausage diagram was customized to reflect the systems of the Mississippi Statewide ITS Architecture. The shaded areas indicate the functions and services that are not currently existing and planned in Mississippi.

This diagram shows the four main subsystems (Travelers, Centers, Vehicles, and Field) of an intelligent transportation system and how each can communicate with each other.



APPLICABLE ITS STANDARDS

ITS Standards are fundamental to the establishment of an open ITS environment that achieves the goals originally envisioned by the USDOT. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve. Standards can be thought of as the glue that holds the various pieces of architecture together. They define how the communications within an ITS environment take place.

While the Mississippi Statewide ITS Architecture is a comprehensive plan which includes various ITS applications, it does not cover every conceivable ITS technology. As such, not all ITS standards will be applicable to the existing and planned projects. Seventy-three (73) ITS standards were identified as key standards supporting the ITS projects in Mississippi. A guide to the key ITS standards that should be considered for use in different types of ITS projects in Mississippi was developed in terms of an application area matrix on pages 102 to 108. Nineteen (19) application areas are included in the matrix. The application areas are deployment-oriented categories that focus on specific ITS services or systems. They can assist deployers in finding the application area within which a particular ITS project fits.

PROJECT SEQUENCE

The Statewide ITS Architecture recommends a sequence in which ITS projects may be implemented. The project implementation sequence is based on a combination of two factors:

- **Prioritization of projects based on existing conditions and stakeholder needs.** ITS projects were prioritized to reflect a deployment path (sequence) of stakeholder needs. As technology, funding opportunities and requirements continue to evolve, it is expected that the Mississippi stakeholders will reevaluate and reprioritize projects frequently.

- **Project dependencies, based on how successive ITS projects can build upon one another.** Project dependencies influence the project sequencing. It is beneficial to identify the information and functional dependencies between projects.

AGREEMENTS FOR IMPLEMENTATION AND OPERATION

The Statewide ITS Architecture provides both a technical and institutional framework for the deployment of ITS in Mississippi. Institutional integration involves cooperation and coordination between various agencies and jurisdictions to achieve seamless operations and interoperability. Information sharing and exchanges between systems require knowledge of the transmission protocol and data formats to ensure compatibility. Coordinating field device operations owned by different agencies requires defined procedures for submitting message requests and rules governing when such requests can be honored. While all interfaces involve good working relationship between agencies for data compatibility, agreements for procedure, operation, and maintenance as well as training may also be critical elements to optimizing the benefits of the architecture. The Statewide ITS Architecture identifies and summarizes common types of agreements used for implementation and operation of ITS projects and systems.

IMPLEMENTATION AND INTEGRATION STRATEGIES

The Statewide ITS Architecture provides guidance for planning ITS projects within the State. It represents a detailed plan for the evolution of the ITS systems in Mississippi and can be used to support transportation planning efforts and ITS project development efforts at state and regional levels. In addition, the Statewide ITS Architecture can be used for support in ITS project development cycle. It provides information that can be used in the initial stages of project definition and development. A typical ITS project development cycle begins with project definition, followed by Request for Proposal (RFP) generation, leading to project implementation. Information in the Statewide ITS Architecture can assist in all three of these phases of project development. It is through the Statewide ITS Architecture that program management and project deployment will be a planned and coordinated effort on both a statewide and regional basis. Upon completion of the Statewide ITS Architecture update, regional architectures will be developed and established based on the guidelines set forth in the statewide model.

An ITS architecture focuses on the integration of systems to gain the maximum benefit of each system's information and capabilities across the transportation network. The most challenging issue in the integration of an ITS architecture into the planning process is the fact that there is more than one planning process. Coordination is important among the MDOT, the MPOs, and Planning and Development Districts for ITS projects in their respective plans. Integration opportunities can be taken advantage of within each of these regions as well as between them. This is the primary intent of the ITS architecture compliance where Federal funding is involved.

Another difficult issue to address is coordination of ITS project planning between the federally funded projects and non-federally funded projects. The Statewide ITS Architecture provides a bridge between federally and non-federally funded projects and systems. Coordinating all of these projects requires an understanding by all existing and potential ITS stakeholders within the entire state. The Statewide ITS Architectures provide a common reference point for all stakeholders to gain insight into the integration of the systems in the state.

DOCUMENTATION OF ITS ARCHITECTURES

The Mississippi Statewide ITS Architecture is documented in two forms. The first is this report, which provides an overview of the Architecture and summary information regarding various aspects of the Architecture. The second form of documentation is the Turbo Architecture database. The database prepared using the Turbo Architecture, a software tool developed by FHWA, captures the details of the Statewide ITS Architecture including definition of stakeholders, inventory, projects, operational concept, market packages, equipment packages, interconnects, interfaces, functional requirements, standards, and agreements.

ARCHITECTURE MAINTENANCE

By its nature, an ITS architecture is not a static set of outputs. The Statewide ITS Architecture is a living document and should be modified as plans and priorities change, ITS projects are

implemented, and the ITS needs and services evolve in the state. An architecture maintenance plan is developed to address the needs for maintenance and updates. The architecture maintenance plan defines the key aspects of the process for updating and maintaining the Statewide ITS Architecture, including:

- Who is responsible for architecture maintenance?
- What will be maintained?
- How will it be maintained?

MDOT will be responsible for all aspects of maintenance for the Statewide ITS Architecture.

1. INTRODUCTION

The Mississippi Statewide Intelligent Transportation Systems (ITS) Architecture provides a "roadmap" for intelligent transportation systems deployment and integration in the state of Mississippi, and ensures ITS system compatibility, connectivity, and standardization.

An ITS architecture describes the "big picture" for ITS deployment in terms of individual components (i.e. subsystems) that will perform the functions necessary to deliver the desired needs. It does not specify the technology used in project implementation, nor does it define how a project is deployed. The ITS Architecture does, however, describe the functions (e.g., gather traffic information or request a route) that are required for ITS, the physical entities or subsystems where these functions reside (e.g., the field or the vehicle), and the information flows and data flows that connect these functions and physical subsystems together into an integrated system.

The United States Department of Transportation (USDOT) set a deadline for the implementation of a regional architecture in order for an agency or region to continue receiving funding through the federal Highway Trust Fund for ITS projects. Any region that is currently implementing ITS projects shall have a regional architecture. In addition, all other regions not currently implementing ITS projects shall have a regional ITS architecture within four years of the first ITS project for that region advancing to final design. Generally, rural areas may adopt the statewide architecture as their regional architecture.

The Mississippi Department of Transportation (MDOT) developed the initial Mississippi Statewide ITS Architecture as a component of the MDOT ITS Strategic Plan in 2002. Since its completion, the architecture has served as a framework for the planning, deployment, integration, and operation of ITS projects and systems throughout the state.

The existing Mississippi Statewide ITS Architecture was developed based on version 3.0 of National ITS Architecture. Currently, the National ITS Architecture has evolved to version 5.1 and significant changes have been made. Version 5.1 has included 3 new subsystems, 19 new terminators and 22 new market packages. Many interconnect and interface flows associated with the market packages as well as standards have also been changed in version 5.1. A revision is needed to update the existing Mississippi Statewide ITS Architecture to comply with the latest version of National ITS Architecture. Also, the existing Mississippi Statewide ITS Architecture needs to be updated to reflect the ITS investments in Mississippi since 2002, and meet the evolving ITS needs and services in the state and regions.

Compliance with the National Architecture is mandatory, as part of the Final Rule (23 CFR 940) published by the Federal Highway Administration (FHWA) and the Policy published by the Federal Transit Administration (FTA) on January 8, 2001 for receiving Federal funds for ITS projects. By taking advantage of the USDOT's National ITS Architecture and developing a Statewide ITS Architecture that is consistent with the National ITS Architecture, the state will be able to secure federal funding for ITS projects as well as take advantage of consistent standards and a growing supplier/vendor market for ITS products and services. As transportation systems become increasingly complex, it is important to ensure that the ITS systems deployed within a

state or region are compatible and can be integrated with one another. This, in turn, promotes the use of common standards and facilitates the expansion of ITS systems, which will lead to national compatibility of ITS systems.

1.1 Mission, Goals and Objectives

Mission

MDOT's ITS Mission, as stated in the original Statewide ITS Strategic Plan, is:

> ***"MDOT will use ITS technologies to improve the quality of life for State residents and visitors by providing more reliable, informative, safer, and flexible passenger and freight multi-modal transportation services."***[2]

The Mississippi Statewide ITS Architecture is developed to be an open and integrated ITS architecture that is compliant with the FHWA Final Rule and FTA Policy on ITS Architecture and Standards to support existing and future ITS projects and enhance compatibility of existing architectures within Mississippi and the emerging National ITS Architecture.

Goals and Objectives

In developing the Mississippi Statewide ITS Architecture, it is important to consider the goals and objectives of stakeholders. The architecture serves as a planning tool for the region it is intended to cover. That is to say, the Statewide ITS Architecture addresses ITS goals and objectives on a broader level than a regional architecture, which would recommend specific projects for deployment within that region. The goals for the Mississippi Statewide ITS Architecture were set forth in the original Statewide ITS Strategic Plan, and are as follows:

- Provide more timely and useful traveler information;
- Enhance motorist safety;
- Improve hurricane evacuation coordination;
- Provide more effective incident management; and
- Manage traffic during and after construction activities.

While these goals do not provide specific details regarding the deployment of local or regional ITS projects, they do outline the general requirements necessary to implement a successful statewide ITS program. It is from these goals that future regional ITS architectures will be developed.

Eight objectives were established for the Mississippi Statewide ITS Architecture, including:

[2] Mississippi Department of Transportation ITS Strategic Plan, 2002.

- Establish an ITS architecture that: is open, receptive and adaptable; is consistent with developing national standards; provides opportunities for private/public partnerships; and encourages and supports interagency cooperation;
- Develop and integrate traveler information, traffic management, transit management, maintenance and construction management, emergency management systems, commercial vehicle operations, archived data management and electronic payment throughout Mississippi as appropriate;
- Define how information is collected, processed, distributed and disseminated;
- Define interfaces and information flow among/between subsystems, agencies, and users;
- Support transportation planning process for ITS projects for the DOT and MPOs;
- Support development of strategies and actions in planning process that lead to an integrated, efficient multi-modal transportation system;
- Support development of ITS projects; and
- Assist in developing, prioritizing, and addressing consistency of proposed transportation investment.

1.2 Description of the Region

Geographic Scope

The region covered by the Mississippi Statewide ITS Architecture is the geographical areas within the state of Mississippi that are not covered under the four regional ITS architectures. The four regional architectures are the Gulf Coast Regional Architecture, the Central Mississippi Regional Architecture, the Hattiesburg Regional Architecture and the Northwest Mississippi Regional Architecture. The Mississippi Statewide Architecture will serve as a framework for ensuring compatibility and interoperability among the four regional architectures developed separately from this document. The areas covered by the Statewide Architecture are primarily rural areas with small to medium size cities where a regional architecture would not be practical. All ITS projects developed within the State of Mississippi (except for the geographical areas covered under the four regional architectures) would be covered under this statewide architecture regardless of which agency was installing the ITS project.

As shown in Figure 1-1, the state is covered by six MDOT districts.

The state of Mississippi has three Metropolitan Planning Organizations (MPOs). MPOs are designated by federal law and established by governors and local governments to consider issues in urbanized areas with populations of 50,000 or more. There are four urbanized areas in Mississippi, including the Gulf Coast, Hattiesburg, Jackson, and the DeSoto County area. The DeSoto County area is part of the Memphis Urban Area MPO, Tennessee. The three MPOs in Mississippi are:

- Gulf Coast Regional Planning Commission
- Forrest-Lamar-Hattiesburg-Petal MPO
- Central Mississippi Planning and Development District

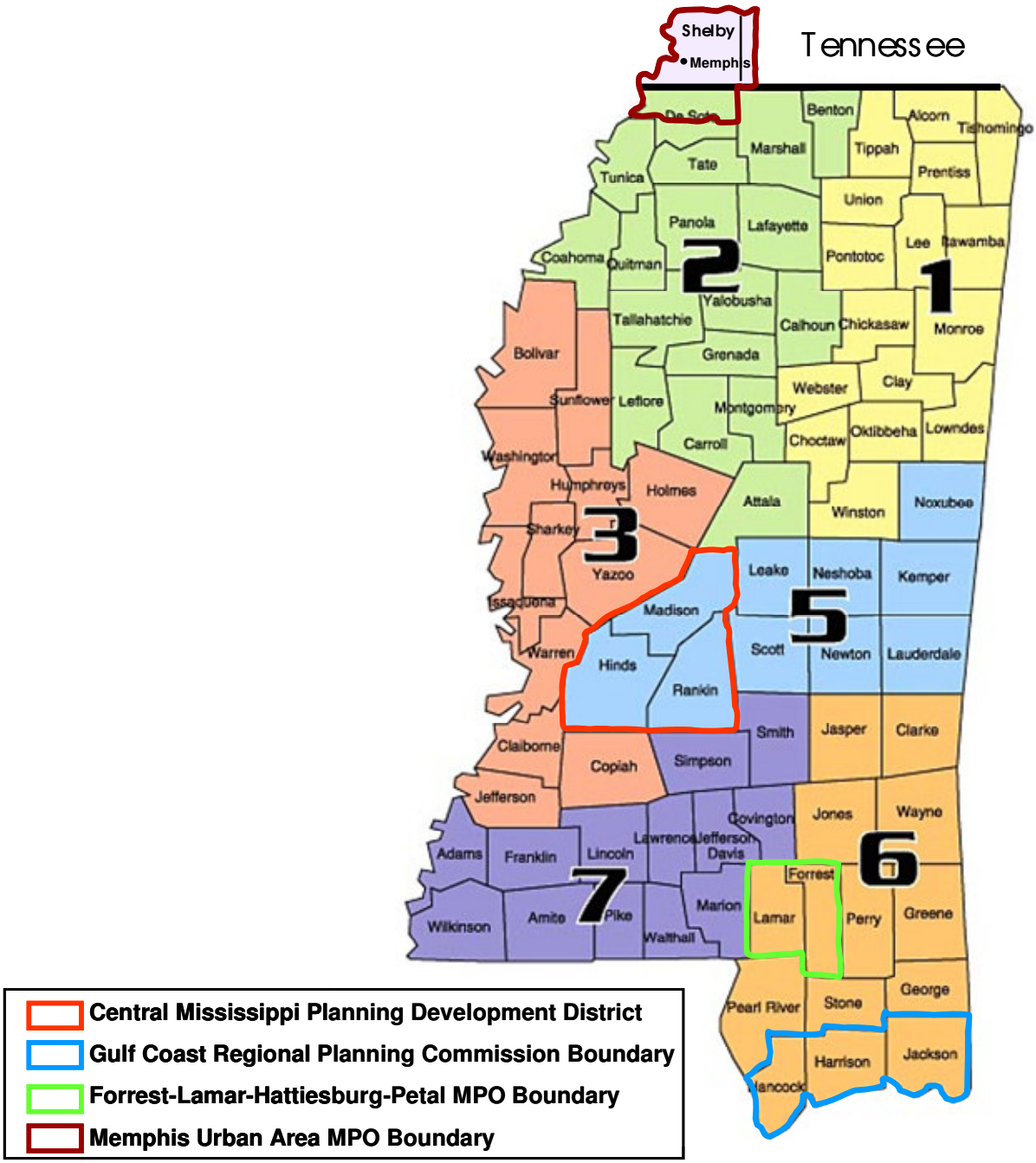


Figure 1-1. Mississippi Statewide ITS Architecture Boundary

The MPOs address transportation planning and programming issues in the metropolitan areas, and are responsible for developing metropolitan transportation plans and transportation improvement programs (TIPs) within their boundaries. Those plans and programs are incorporated into the State Transportation Plan and the State Transportation Improvement Program (STIP). The geographical boundaries of the three MPOs in Mississippi are also illustrated in Figure 1-1.

Service Scope

The Mississippi Statewide ITS Architecture covers services across a broad range of ITS, including traffic management, public transportation, traveler information, commercial vehicle operations, emergency management, maintenance and construction management, archived data management, and electronic payment.

Timeframe

The timeframe considered for the Mississippi Statewide ITS Architecture is a 20-year vision for ITS activities in Mississippi. This means that the updated Mississippi Statewide ITS Architecture addresses existing ITS systems as well as those planned for development over the next 20 years, and represents a vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in Mississippi. The architecture represents a snapshot of the currently anticipated projects based on information from stakeholders. As such, the architecture requires regular updates to ensure that it maintains an accurate representation of the state.

1.3 Organization of the Report

This report is organized based on the general process for the development of an ITS architecture. The major sections of the report are summarized as the following:

- **Section 1 - Introduction**: This section identifies the mission, goals and objectives of the Mississippi Statewide ITS Architecture. It also provides a general description of the area covered in the Statewide ITS Architecture.

- **Section 2 – Mississippi Statewide ITS Architecture Update Process**: This section describes process for updating the Mississippi Statewide ITS Architecture and summarizes the requirements of the final FHWA Rule and FTA policy on ITS Architecture and Standards.

- **Section 3 – Stakeholders and Operational Concept**: This section identifies and describes participating agencies and stakeholders and their roles and responsibilities in the operation and implementation of the ITS systems and/or components within the state.

- **Section 4 – Inventory**: This section identifies the existing and planned ITS elements within the state.

- **Section 5 – User Services and Market Packages**: This section identifies a list of user services and market packages that are applicable to the state. The user services describe what transportation functions and services should be provided from the user's perspective. The market packages provide a collection of service-oriented technology bundles that can be incorporated in the development of the Statewide ITS Architecture.

- **Section 6 – Subsystems, Equipment Packages and Functional Requirements**: The customized list of market packages developed in Section 5 was used to define the subsystems, equipment packages, and functional requirements that are necessary for the implementation of the customized market packages.

- **Section 7 – Interconnects and Architecture Flows**: This section describes the physical architecture by defining interfaces between equipment and systems that may be deployed by different organizational or operating agencies throughout the state.

- **Section 8 – ITS Standards**: This section describes a list of key standards that support the implementation of the Statewide ITS Architecture.

- **Section 9 – Project Sequencing**: This section provides an implementation strategy as well as the sequencing of ITS project required for implementation over the next 20 years.

- **Section 10 – Agreements**: This section identifies and summarizes a list of agreements between agencies that may be required for implementation and operation.

- **Section 11 – Implementation and Integration Strategy**: This section describes the relationship between the Statewide ITS Architecture and transportation planning process. It summarizes how the Statewide ITS Architecture can be used to assist in transportation planning and project implementation. This section also describes the opportunities and considerations for integrating ITS projects and systems at the regional and statewide levels.

- **Section 12 – Architecture Maintenance Plan**: This section describes a process for controlled updates to the Statewide ITS Architecture baseline so that the architecture continues to accurately reflect the existing ITS capabilities and future plans in the state.

2. MISSISSIPPI STATEWIDE ITS ARCHITECTURE UPDATE PROCESS

2.1 National ITS Architecture

As stated previously, an ITS architecture provides a "road map" for system development and ensures system compatibility, connectivity, and standardization. This is accomplished by:

- Identifying key stakeholders and interrelationships in the region;
- Describing required activities and/or functions to be completed;
- Defining the interconnections and interdependencies between functions; and
- Developing a "blueprint" for integration of systems.

Standardization helps by establishing a common "language" or vocabulary to describe ITS systems, which reduces confusion and facilitates communication within an organization, between organizations within a region, with contractors or clients, and among counterparts and colleagues nationwide.

The National ITS Architecture provides a common framework for planning, defining and integrating ITS systems and ensures system compatibility, connectivity, and standardization. It comprises the logical architecture and physical architecture which satisfy a defined set of user services. Compliance with the National ITS Architecture is a mandatory requirement for receiving Federal funds for ITS projects. The National ITS Architecture is maintained by the United States Department of Transportation (DOT) and the latest version is available on the DOT web site at http://www.iteris.com/itsarch/index.htm.

In discussing the National ITS Architecture, it is important to be familiar with certain terminologies, which are described below:

User Services describe what the system will do from the user's perspective. This term can be used to describe ITS systems in a rural, suburban, or urban setting. Identifying user services allows the process of system or project definition to begin by establishing the high-level services that will be provided to address a region's problems and/or needs. There are 33 user services defined in the version 5.1 of National ITS Architecture. These user services are grouped by eight user service bundles, including:

- Travel and Traffic Management
- Public Transportation Management
- Electronic Payment
- Commercial Vehicle Operations
- Emergency Management
- Advanced Vehicle Safety Systems
- Information Management
- Maintenance and Construction Management

The ***logical architecture*** part of the National ITS Architecture "defines what must be done to support the ITS user services. It defines the processes that perform ITS functions and the information that is shared between these processes. The logical architecture consists of data flow diagrams, process specifications, and data dictionary entries. The logical architecture is not technology specific, nor does it dictate a particular implementation. This implementation independence makes the logical architecture accommodating to innovation, scalable from small-scale implementations to large regional systems, and supportive of widely varied system designs".[3]

The ***physical architecture*** is "the part of the National ITS Architecture that provides agencies with a physical representation of the important ITS interfaces and major system components. It provides a high-level structure around the processes and data flows defined in the logical architecture. The principal elements in the physical architecture are the subsystems and architecture flows that connect these subsystems and terminators into an overall structure. The physical architecture takes the processes identified in the logical architecture and assigns them to subsystems. In addition, the data flows (also from the logical architecture) are grouped together into architecture flows. These architecture flows and their communication requirements define the interfaces required between subsystems, which form the basis for much of the ongoing standards work in the ITS program".[3]

Subsystems are individual pieces of the overall Intelligent Transportation System that perform particular functions, such as managing traffic or providing traveler information. Subsystems are grouped into four classes: centers, vehicles, field, and travelers.

Market Packages are pieces of the architecture that are required to implement a particular transportation service. It also describes a collection of equipment packages that provides the functions necessary to deliver a given ITS service. Market packages are tailored to fit real world transportation problems and needs, either separately or in combination with each other. Currently, there are a total of 85 market packages in the version 5.1 of National ITS Architecture.

Equipment Packages group similar functions of a particular subsystem together into a package of hardware and software capabilities. They are closely associated with market packages and are used as a basis for estimating deployment costs. Currently, there are a total of 198 equipment packages defined in the version 5.1 of National ITS Architecture.

Standards define the interfaces between physical architecture components or entities and are fundamental to the establishment of an open ITS environment. Standards also facilitate the deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve. There are currently over 110 ITS standards defined in the National ITS Architecture. By requiring compliance with these defined standards, the interoperability, interchangeability, and expandability of ITS systems can be ensured.

[3] US Department of Transportation. http://itsarch.iteris.com/itsarch/html/glossary/glossary.htm. (accessed August 2006).

2.2 Mississippi Statewide ITS Architecture Update Process

The process used to develop an ITS architecture is illustrated in Figure 2-1. Figure 2-1 shows six general steps in the "lifecycle" of an ITS architecture. In the first four steps, the ITS architecture products are developed and then these products are used and maintained in steps 5 and 6. The development process begins with basic scope definition and team building and moves through increasingly detailed steps, culminating in specific products that will guide the "implementation" of the ITS architecture.

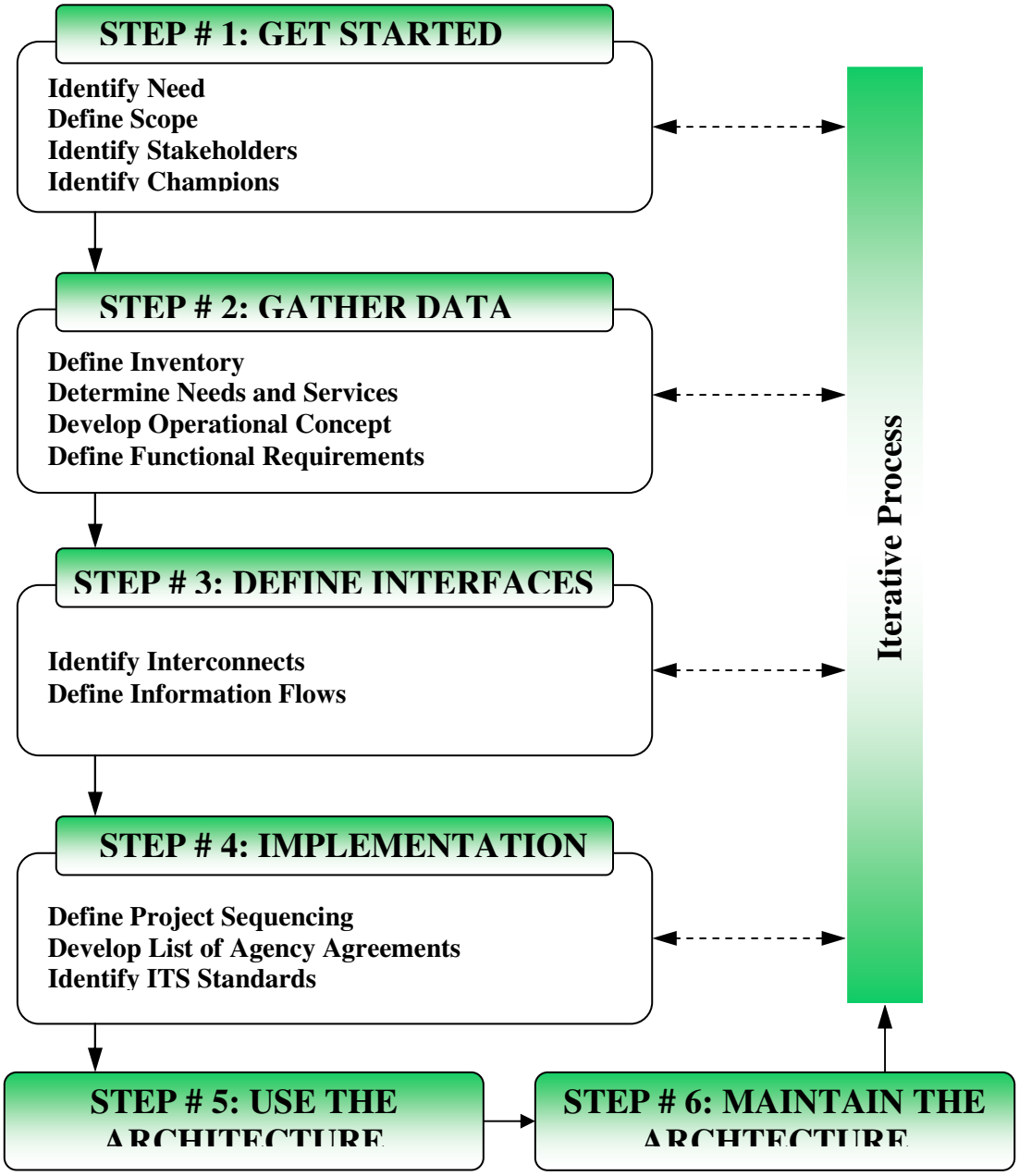


Figure 2-1. Architecture Development Process

As presented in Table 2-1, a migration analysis on the existing Mississippi Statewide ITS Architecture has been performed. Following the architecture development process, the migration analysis has identified the associated requirements of FHWA Final Rule and FTA Policy, the compliance and the discrepancy/deficiency of the existing Mississippi Statewide ITS Architecture to the FHWA/FTA requirements, and the needs and actions required to update the existing Mississippi Statewide ITS Architecture.

The update of the Statewide ITS Architecture begins with the re-identification of stakeholders and their corresponding transportation needs. The success of the Statewide ITS Architecture depends on participation by a diverse set of stakeholders. The objective of identifying stakeholders is to identify and engage stakeholders that own or operate ITS systems and other agencies that have an interest in the transportation issues within the State of Mississippi.

Information on existing and planned ITS projects within the state was recollected through a comprehensive stakeholder survey and literature review. Stakeholder surveys were distributed to 200 agencies and organizations to gather information on their existing ITS infrastructure inventory, plans to deploy ITS projects or systems, and to determine the needs of each agency that would be served by the implementation of ITS. The following resources were reviewed in the architecture update process:

- Existing Mississippi ITS Architecture
- Mississippi ITS Strategic Plan
- Mississippi Long Range Transportation Infrastructure Plan (MULTIPLAN)
- Comprehensive Emergency Transportation Response Plan
- HPFL-MPO Transportation Plan Update
- Jackson Urbanized Area 2025 Transportation Plan
- Mississippi Gulf Coast Urbanized Area 2025 Transportation Plan
- State Final STIP 2005-2006
- Jackson Metro Area Regional Transit Plan
- Others relevant project reports and websites

A series of stakeholder meetings was held throughout the state in July and September 2006. A total of 61 attendees from the Department of Transportation, City/County Traffic Engineering, law enforcement, transit, planning, and other agencies attended one of four meetings held in Batesville, Hattiesburg, and Jackson. During these meetings, the attendees were given an overview of the Mississippi Statewide ITS Architecture project and the National ITS Architecture.

Table 2-1. Mississippi Statewide ITS Architecture Migration Analysis

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
1	Define Scope	A description of the region	The geographical scope was defined as the entire state.	Planning timeframe was not clearly defined. Based on the project implementation schedule in the Strategic Plan, it is assumed the timeframe is beyond 10 years.	• Define the architecture timeframe.
2	Identify Stakeholder	Identification of participating agencies and other stakeholders	A list of stakeholders was identified	None	• Refine existing stakeholders and identify new stakeholders • Stakeholders would include various levels, including multi-state, state, region, and county/city.
3	Define Inventory	An inventory of existing and planned systems	• Existing ITS inventory elements were identified • The inventory elements were mapped to the subsystems and terminators defined in the National ITS Architecture 3.0.	• The inventory did not include the planned projects/systems. • Some key elements were not identified in the Turbo database. e.g., field and vehicle subsystems.	• Update ITS inventory including all the existing and planned ITS systems based on the Strategic Plan, stakeholder inputs, and other resources. • Provide a description of each architecture element. • Re-map each architecture inventory element to the subsystems and terminators based on the National ITS Architecture version 5.1.

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
4	Determine Needs and Services	An understanding of the regional needs and ITS services	• The Mississippi ITS strategies, the goals supported by the strategies, and related user services were identified. • The statewide and regional needs were identified. • The market packages were selected based on the identified user services. • A strengths, weaknesses, opportunities, threat (SWOT) analysis was performed for each selected market package. The market packages were prioritized as short term and medium/long term based on the SWOT analysis results.	• The selected market packages were not customized to correspond with the existing and planned ITS systems • In the Turbo Architecture database, ITS elements were not identified at market package level. • The existing architecture was developed based on the National ITS Architecture 3.0.	• Update the statewide user needs (issues and challenges) and user services based on the stakeholder inputs. • Identify market packages based on the updated user needs, user services, and existing and planned ITS systems. • Customize the selected market packages by tailoring the inventory elements (subsystems or terminators) in these market packages.

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
5	Develop Operational Concept	An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders	• The roles and responsibilities of key stakeholders were identified in the Strategic Plan. • Five ITS scenarios for each metropolitan region were discussed and documented. The scenarios described roles and responsibilities of the stakeholders involved in the operation and implementation of the ITS systems.		• Update roles and responsibilities in accordance with the new stakeholder list. • Categorize the roles and responsibilities by the market packages identified in the Statewide ITS Architecture or by the eleven Roles and Responsibilities Areas defined in the Turbo Architecture Software.
6	Define Functional Requirements	System functional requirements	The high-level functional requirements on the selected market packages were defined.	The turbo database was developed with prior version (version 2.0) of Turbo Architecture, and therefore equipment packages and associated functional requirements were not included in the Turbo Architecture database.	• Identify the equipment packages performed by each inventory element based on the customized market packages. • Use the National ITS Architecture functional requirements as a baseline, and tailor them to provide a more accurate function picture on the specific inventory element.

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
7	Identify Interconnects	Interface requirements and information exchanges with planned and existing systems	Interconnects and information flows were identified in the Turbo Architecture database.	• Many changes on the interconnects and information flows have occurred in the National ITS Architecture, and therefore updates should be performed to be consistent with the latest version of the National ITS Architecture. • The inventory elements did not represent all the existing and planned ITS systems. • In the Turbo Architecture database, no interconnects and information flows were identified for CVO.	Update interconnects and information flows to correspond to the updated inventory elements and customized market packages.
8	Define Information Flows				

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
9	Define Project Sequencing	The sequence of projects required for implementation	The recommended ITS projects for deployment in Mississippi were identified in the Strategic Plan. The projects were prioritized into short term (0 – 5 years), medium term (5 – 10 years), and long term (beyond 10 years).		• Update the planned projects to reflect project additions/deletions as well as changes in project status, and project definitions, based on the stakeholder inputs and the state and regional planning documents • Re-define the project sequencing based on existing conditions and stakeholder needs, and how successive ITS projects can build upon one another.
10	Develop List of Agency Agreements	Any agreement (existing or new) required for operations, including at a minimum those affecting ITS project interoperability, utilization of ITS related standards, and the operation of the projects identified in the architecture	The Strategic Plan identified interagency activities or institutional issues that could offer opportunities for deployment or present barriers to ITS deployment. Some existing agency agreements were noted in the Strategic Plan.	The existing documents did not provide a list of agreements (existing and/or planned) that would be required to support existing and future ITS system implementations.	• Collect existing stakeholder agreements. • Identify and develop a list of potential stakeholder agreements (existing and/or planned) which would be required to support existing and future ITS system implementations and stakeholder cooperation.

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
11	Identify ITS Standards	Identification of ITS standards supporting regional and national interoperability	ITS Standards were identified in the Turbo Architecture database.	ITS Standards have evolved since the development of the existing Statewide ITS Architecture.	• Re-identify the applicable ITS standards based on the updated information flows and the latest version of the National ITS Architecture. • Provide a guide to the identified ITS standards for use in different types of ITS projects in Mississippi.
12	Use the Architecture		Not covered.	It is recommended to include a document summarizing how the Statewide ITS Architecture can/should be used in support of the transportation planning process and ITS project implementation.	Develop the Mississippi Statewide ITS Architecture implementation plan.

No	Architecture Development Process	FHWA/FTA Requirements	Compliance of Existing Architecture	Discrepancy and Deficiency of Existing Architecture	Update Needs & Migrating Actions
13	Maintain the Architecture	Developing and implementing procedures and responsibilities for maintaining the ITS architecture	Not covered.	An architecture maintenance plan should address the reasons/criteria for updating the architecture, define the communication process for updating the architecture, identify the responsibilities of the stakeholders or groups involved with maintenance activities, and document necessary procedures for the architecture maintenance.	Develop the Mississippi Statewide ITS Architecture maintenance plan.

The results of literature review and survey were compiled and used as a foundation for updating the Statewide ITS Architecture. The existing and planned ITS systems were then mapped against the Market Packages and the physical architecture defined in the National ITS Architecture. A market package is a "bundle" of technology services that is often purchased together as a group to provide the functions necessary to deploy the services. The selection of market packages allows for the identification of equipment packages and subsystems. The physical architecture defines the Physical Entities (Subsystems and Terminators) that make up an intelligent transportation system. It defines the Architecture Flows that connect the various Subsystems and Terminators into an integrated system.

An ITS architecture coordinates overall system operation by defining interfaces between equipment and systems (interconnect and architecture flows). These interfaces describe the functions of the systems by showing the information that flows between various systems and subsystems. Upon identification of the system interfaces, additional products were defined to guide the implementation of planned ITS projects. These products include a sequence of projects, list of agency agreements required for operations, and a list of ITS standards that should be considered for project implementation.

It should be noted that the Mississippi Statewide ITS Architecture should not be considered as the singular architecture for all information flows and communications among the various stakeholders in the state. ITS projects within the state that are outside the Mississippi Statewide ITS Architecture exist, and they may be included in regional ITS architectures developed by the MPOs.

2.3 Systems Engineering

Final Rule 940 requires that all ITS projects funded with highway trust funds be developed based on a systems engineering analysis. Systems engineering is a phrase used to describe the cyclical process of planning, designing, implementing, testing, operation, and maintenance of an ITS system or project throughout its useful life. The system engineering process begins with the development and implementation of an ITS architecture and continues by outlining the steps and level of detail of each phase of project deployment, from high-level tasks such as establishing the Concept of Operations to very detailed component design, installation, and testing. The purpose of the system engineering process is to ensure that a well-planned foundation is in place and then to affirm the requirements of an ITS system.

As illustrated in Figure 2-2 Systems Engineering Approach recommended by the FHWA, an ITS architecture provides a starting point for systems engineering analyses that are performed during ITS project development. The ITS Architecture is a dynamic document that requires periodic updates to reflect changes in an agency's ITS program due to funding levels, evolving project or system requirements, or the introduction of improved technology. Once ITS projects are programmed, the ITS architecture provides initial inputs to support the systems engineering process including the establishment of the concept of operations, requirements, and high-level design and test planning of ITS projects. The ITS architecture improves continuity across the project lifecycle, from planning through project development and operations. As required by the FHWA and FTA, the Statewide ITS Architecture serves to meet the criteria of Final Rule 940.

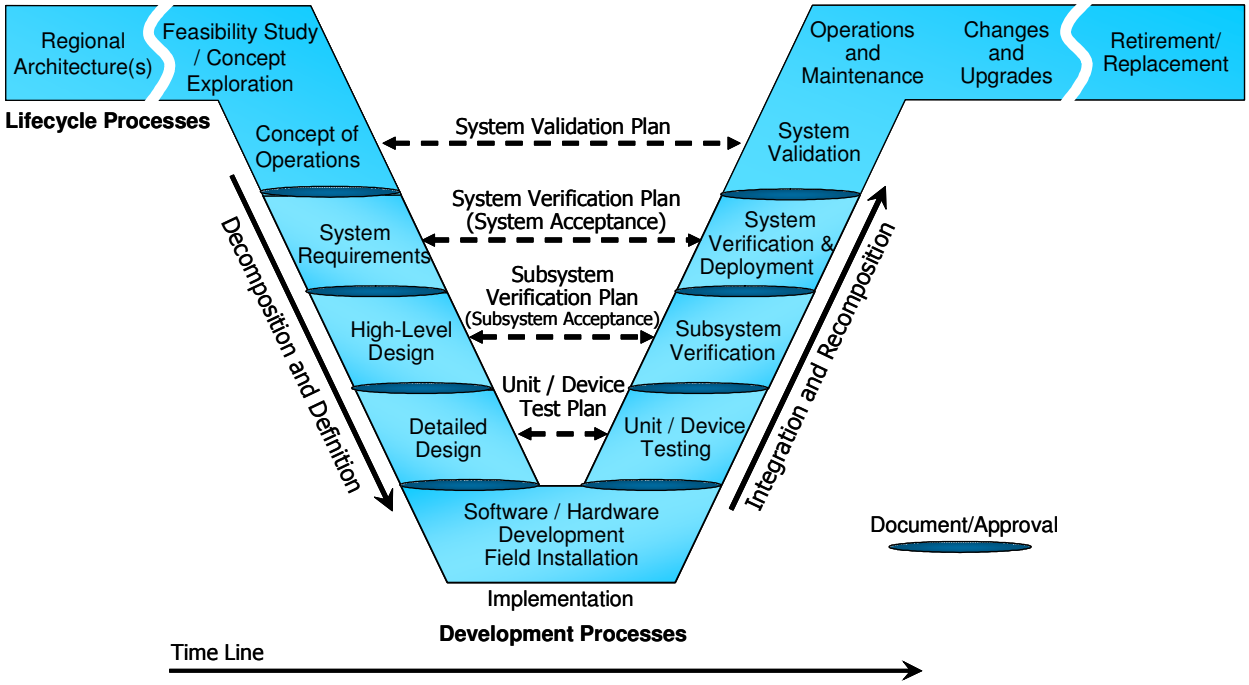


Figure 2-2. Systems Engineering Approach

The development and implementation of the Mississippi Statewide ITS Architecture within the framework of the National ITS Architecture and using the system engineering approach will help ensure the stability and longevity of ITS projects and systems deployed throughout Mississippi. From the Statewide Architecture, regional architectures will be developed to provide a more detailed foundation on which to build the region's ITS infrastructure.

2.4 Requirements of the Final FHWA Rule and FTA Policy on Architecture

Table 2-2 shows how the requirements of the rule are met by the outputs developed for the Mississippi Statewide ITS Architecture.

Table 2-2. Mapping of Requirements to Architecture Outputs

Statewide/Regional ITS Architecture Requirements	Where Requirements documented
Description of region	Geographic definition, as well as timeframe and scope of services are given in Section 1 of this document.
Identification of participating agencies and other stakeholders	Listing of stakeholders and their definitions is given in Section 3.1 of this document. An inventory of the elements operated by the stakeholders is contained in Section 4 of this document.
An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders	The operational concept is defined in Section 3.2 of this document.
A list of any agreements (existing or new) for deployment and/or operations	A discussion of existing and new agreements is given in Section 10 of this document.
System functional requirements	The functional requirements of the ITS systems are described in an overview in Section 7 of this document, and are provided in detail in the Turbo Architecture database.
Interface requirements and information exchanges with planned and existing systems and subsystems	The Interfaces and information flows are described in an overview in Section 6 of the document, and are described in detail in the Turbo Architecture database.
Identification of ITS standards supporting regional and national interoperability	An overview of the ITS standards is given in Section 8 of the document. The detailed listing of ITS standards applicable to each interface in the architecture is described in the Turbo Architecture database.
The sequence of projects required for implementation	Projects and their sequencing are covered in Section 9 of this document.
Procedures and responsibilities for maintaining ITS architecture	Procedures and responsibilities for maintaining the Statewide ITS Architecture are covered in Section 12 of this document.

As summarized in Table 2-2, this document, in conjunction with the Turbo Architecture database for the Mississippi Statewide ITS Architecture, satisfies the mandatory requirements defined in the ITS Architecture and Standards Final Rule and Policy set forth by the FHWA and FTA.

3. STAKEHOLDERS AND OPERATIONAL CONCEPT

3.1 Identification of Participating Agencies and Stakeholders

Stakeholders are commonly considered to be those who own or operate ITS systems in the region as well as those who have an interest in regional transportation issues. As stakeholders provide crucial input regarding the region's transportation investment and ITS deployments, stakeholder participation and coordination is critical to the success of the ITS architecture development. The Mississippi Statewide ITS Architecture includes a wide range of stakeholders. Table 3-1 lists the agencies and stakeholders who participated in implementation and operation of the ITS projects in Mississippi.

The participating agencies and stakeholders of the Mississippi Statewide ITS Architecture were identified from the following sources:

- Existing Mississippi Statewide ITS Architecture
- Existing transportation planning documents including Mississippi ITS Strategic Plan, Mississippi Long Range Transportation Infrastructure Plan (MULTIPLAN), Comprehensive Emergency Transportation Response Plan, Jackson Urbanized Area 2030 Transportation Plan, Mississippi Gulf Coast Urbanized Area 2025 Transportation Plan, Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization 2001 Transportation Plan, and others.
- In collaboration with the MDOT as well as through stakeholder surveys and workshops, additional stakeholders that were not covered by the existing statewide and planning documents were also identified and included in the Statewide ITS Architecture.

Table 3-1 includes both specific individual stakeholders and broadly defined generic stakeholders. Most of the specific stakeholders are at multi-state level and state level positions. Generic stakeholders, representing a group of stakeholders that provide similar roles, responsibilities and functions, are typically at regional and county/city levels. The main purpose of defining and using generic stakeholder groups at regional and county/city level is to allow a more efficient way to organize the Statewide ITS Architecture and to keep the architecture at a maintainable level.

Table 3-1. Mississippi Statewide ITS Architecture Stakeholders

Stakeholder Name	Stakeholder Description
Multi-State Stakeholders	
Federal Motor Carrier Safety Administration (FMCSA)	FMCSA is part of the US DOT. Administration activities contribute to ensuring safety in motor carrier operations through strong enforcement of safety regulations, targeting high-risk carriers and commercial motor vehicle drivers; improving safety information systems and commercial motor vehicle technologies; strengthening commercial motor vehicle equipment and operating standards; and increasing safety awareness.
Federal Highway Administration (FHWA)	FHWA is a Federal agency with the broad responsibility of ensuring that America's roads and highways continue to be the safest and most technologically up-to-date. FHWA provides financial and technical support to State, local, and tribal governments for constructing, improving, and preserving America's highway system.
Federal Transit Administration (FTA)	FTA administers public transportation including buses, subways, light rail, commuter rail, monorail, passenger ferries, trolleys, inclined railways, and people movers. FTA provides financial assistance to state and local transit providers for developing new transit systems and improving, maintaining, and operating existing systems. FTA is a sister agency to FHWA.
International Registration Plan (IRP), Inc.	The IRP, Inc. administers International Registration Plan. For motor carriers operating under the International Registration Plan, registering a fleet of inter-jurisdictional vehicles becomes a one-stop process for motor carriers, with a simple, one-step registration.
International Fuel Tax Association (IFTA), Inc.	The IFTA, Inc. administers the International Fuel Tax Agreement.
National Weather Service	National Weather Service provides weather forecast and issues warnings related to adverse weather conditions.
National Park Service	The National Park Service operates the 444-mile Natchez Trace Parkway and several other facilities in Mississippi.

Stakeholder Name	Stakeholder Description
State Level Agencies	
Mississippi Department of Transportation (MDOT)	The MDOT plans, constructs, maintains and improves the state's roads and bridges, and provides planning and financial support for other modes of transportation. The MDOT includes: • Maintenance Division – administer many programs necessary for the preservation, maintenance and safety of our state and federal highways; • Law Enforcement Division - enforce state laws governing the operations of commercial vehicles; • Rails Division – manage the Federal-aid Railroad Grade Crossing Safety program, inspect grade crossing signals and track conditions, and administer funds to railroads and local governmental jurisdictions; • Public Transit Division - administer grants to develop, implement and manage general public and specialized transportation programs; • District Offices – responsible for coordinating, planning, design, construction and maintenance of the intermodal transportation network within the jurisdiction area; and • Other internal divisions/offices.
Mississippi Department of Public Safety	A government agency providing state law enforcement, highway safety, and emergency management. The department consists of the following divisions/bureaus: • Mississippi Highway Patrol • Bureau of Investigation • Bureau of Narcotics • Office of Homeland Security • Mississippi Crime Lab • State Medical Examiner Office • Office of Administrative Operations • Law Enforcement Officer's Training Academy • Crime Stoppers Advisory Council • Division of Public Safety Planning
Mississippi Office of Homeland Security	An office of the Mississippi Department of Public Safety that supports, coordinates, and maintains state and local homeland security activities.
Mississippi Highway Patrol (MHP)	A division of the Mississippi Department of Public Safety that routinely patrols state roadways, including interstates, state highways and secondary county roads, enforces motor vehicle laws, and assists in major incidents and emergency. The MHP includes 9 districts.
Mississippi Emergency Management Agency (MEMA)	A government agency that prepares, coordinates and supports statewide emergency management activities for major emergencies and disasters.
Mississippi Department of Environmental Quality	Provides pollution control of the state's air, water, and soils in Mississippi.
Mississippi State Tax Commission	Manages all the state taxes including commercial vehicle tax.

Stakeholder Name	Stakeholder Description
Mississippi Bureau of Investigation	A bureau of the Mississippi Department of Public Safety that responsible for issuing AMBER Alerts.
Mississippi Public Service Commission (MPSC) Motor Carrier Division	A division of Mississippi Public Service Commission that manages motor carrier application and registration within the state.
Neighboring States	A stakeholder group representing agencies and stakeholders of adjacent states that coordinate with Mississippi agencies on transportation management within state border regions. Neighboring states include Tennessee, Alabama, Louisiana, and Arkansas.
Regional Level Stakeholders	
Rural Transit Agencies	A stakeholder group of transit agencies providing services to rural areas and small cities, such as Pearl River Valley Opportunity (PRVO), Southern Mississippi Planning & Development District (SMPDD), Delta Area Rural Transit System (DARTS), Natchez Transit System, Meridian Transit Authority, Choctaw Transit Authority, Lowndes County Dial-A-Bus, etc.
Intercity Transit Providers	Provide transit services between cities, such as Greyhound, AMTRAK, etc.
Metropolitan Planning Organizations	A stakeholder group representing three MPOs, including Gulf Coast Regional Planning Commission, Forrest-Lamar-Hattiesburg-Petal MPO, and Central Mississippi Planning and Development District, to provide transportation planning and technical assistance services to various agencies within the MPO jurisdiction areas.
County/City Level Stakeholders	
Counties and Cities	A stakeholder group representing all the counties, cities, municipalities, and universities that have ITS components.
County and City 911 Dispatch Centers	A stakeholder group representing 911 dispatch centers that receive 911 emergency calls and dispatch sheriff, police, fire and EMS within the jurisdiction areas. Dispatch centers may belong to city police departments, county sheriff's offices, or university police.
County and City Parking Operators	A stakeholder group representing public agencies or private companies for parking facility operation and management.
County Engineering and City Public Works	A stakeholder group representing county engineering offices/city public works departments responsible for traffic control and management, and county/city roadway and bridge maintenance and construction (including snow and/or ice control) within the jurisdiction areas. Involved agencies may use other different office/department names.
County Emergency Management Agencies	A stakeholder group representing county emergency management agencies responsible for coordinating, maintaining and administering emergency management and homeland security practices within county jurisdiction areas. Involved agencies may use other different names such as Civil Defense.

Stakeholder Name	Stakeholder Description
County and City Public Safety Agencies	A stakeholder group representing county sheriff's offices, city police and university police departments, city fire departments, and county/city emergency medical services, which are responsive for public safety and incident/emergency response within the jurisdiction areas.
Urban Transit Agencies	A stakeholder group of transit agencies providing transit services to large urban areas (greater than 50,000 population) and universities. The group includes Coast Transit Authority (CTA), City of Jackson Public Transportation (JATRAN), Hattiesburg Area Readi Transit (HART), Mississippi State University Campus Transit System, and Mississippi Valley State University Mass Transit (MVSUMT).
Airports	Airports owning regional airport information systems, including Jackson International Airport and Gulfport-Biloxi International Airport.
Other Stakeholders	
Local Traffic Generators	A stakeholder group representing traffic generators/event promoters that have knowledge of events that may impact travel on roadways or other modal means and share information with MDOT and emergency service providers.
Railroad Companies	A stakeholder group representing owner/operators of rail transportation facilities and associated ITS equipment and communications.
Intermodal Rail Facility Operators	A stakeholder group responsible for operating railroad intermodal facilities which transport goods between railroad and other transportation modes including truck and water.
Port Authorities	A stakeholder group responsible for water port management and operation.
Private Partnership Toll Facility Operations	A private vendor who will have the responsibility for operating a toll facility on the proposed Airport Parkway.
Private Trucking Companies	A stakeholder group representing trucking companies that operate commercial vehicles.
Media Outlets	TV and radio stations, news media, etc.

3.2 Operational Concept

An operational concept defines each stakeholder's current and future roles and responsibilities in the implementation and operation of the ITS systems in Mississippi. Table 3-2 summarizes the general roles and responsibilities of the participating stakeholders identified above. As illustrated, the roles and responsibilities are categorized in eleven transportation service areas. These transportation service areas provide general classifications of what functions the participating agencies are providing or will provide. The eleven service areas and their major functions are described in the following.

Archived Data Management – Archived data management represents the functions that collect, process, store and utilize transportation data with respect to traffic, incidents, maintenance and construction, public transportation, commercial vehicle operations, vehicle emissions, parking and other functions.

Commercial Vehicle Operations – Commercial vehicle operations represents the administrative functions that support commercial vehicle credentials, tax, and safety regulations.

Electronic Payment – Electronic payment represents the functions that support electronic payment of transportation services, including transit, parking and tolls.

Emergency Management – Emergency management represents the functions that provide emergency call taking, public safety dispatch, disaster response and evacuation, securing monitoring and other security and public safety-oriented services.

Incident Management – Incident management represents the functions that manage both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. It includes incident detection and verification, appropriate incident response, and regional coordination between traffic management agencies, maintenance and construction management agencies, emergency management agencies and others.

Maintenance and Construction Management – Maintenance and construction management represents the functions that provide construction management and maintenance of roadways, including snow and ice removal.

Parking Management – Parking Management represents the functions that provide enhanced monitoring and management of parking facilities and coordination between parking facilities.

Public Transportation – Public transportation represents the functions that plan, manage, operate and maintain transit services. It also includes the function that provides transit traveler information.

Traffic Management – Traffic management represents the functions that manage a broad range of transportation facilities including freeway systems, rural and suburban highway systems, and urban and suburban traffic control systems.

Traveler Information – Traveler information represents the functions that collect, process, store, and disseminate static and real time transportation information to the traveling public.

Transportation Planning and Architecture Maintenance – Transportation planning and ITS architecture maintenance represents transportation planning functions and other related services. It also includes roles and responsibilities for the development and maintenance of an ITS architecture within the stakeholder's jurisdictional boundary.

Table 3-2. Operational Concept for Mississippi Statewide Architecture

Stakeholder	Transportation Service	Role/Responsibility	Status
Mississippi Department of Transportation	Archived Data Management	Maintain databases for Highway Performance Monitoring System (HPMS), Road Weather Information System (RWIS), MDOT Accident Database, and commercial vehicle credential and safety data, etc.	Existing/ Planned
	Commercial Vehicle Operations	Administer credential and safety information of carriers, drivers and vehicles.	Existing
		Manage Commercial Vehicle Information Systems and Networks (CVISN) Credentialing Infrastructure System.	Existing/ Planned
		Provide electronic permit applications and reporting, electronic commercial vehicle inspection system, and commercial vehicle operation and management information via Internet.	Existing
		Operate permanent and portable Weigh-in-Motion stations, PrePass, and other roadside inspection equipment throughout the state for law and regulations enforcement.	Existing
		Coordinate commercial vehicle inspection with Mississippi Highway Patrol and local law enforcement agencies.	Existing
	Emergency Management	Participate in coordinated emergency response with local emergency agencies.	Existing
		Provide resources to support emergency management when requested by emergency agencies.	Existing
		Support disaster response and recovery, and disaster evacuation.	Existing
		Provide disaster-related information to the public.	Existing
		Operate permanent Dynamic Message Signs (DMS) for AMBER Alerts and weather alerts.	Planned
	Incident Management	Perform incident verification through video surveillance.	Existing
		Provide incident information to local incident response agencies including emergency management, public safety, and/or transportation.	Existing
		Coordinate incident response, road closures and detours with local incident response agencies.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
Mississippi Department of Transportation	Incident Management	Provide resources to support incident management when requested by local incident response agencies	Existing
		Provide highway service patrol services to assist motorists in minor incidents.	Planned
		Operate roadside equipment including portable and permanent DMS for incident management.	Planned
		Operate automatic truck rollover warning system.	Planned
	Maintenance and Construction Management	Provide construction management and perform maintenance of interstate, state highways and bridges.	Existing
		Dispatch maintenance vehicles for planned activities (road maintenance, snow plowing, etc.) and unplanned incidents within the jurisdiction area.	Existing
		Communicate maintenance and construction schedule and other related information with local agencies.	Existing
		Provide maintenance on agency vehicle fleet.	Existing
		Maintain DOT roadside equipment.	Existing
		Operate RWIS system (weather sensors and fog sensors) and collect road weather information along major roadways, and distribute road weather information to local public safety agencies and transportation agencies.	Planned
		Operate field devices including sensors, cameras, and DMS for maintenance and construction activities.	Planned
		Operate automated vehicle location (AVL)/global positioning system (GPS) technology to track maintenance vehicles locations and collect relative data for analysis.	Planned
		Operate portable TMCs to manage work zone activities.	Planned
	Public Transportation	Coordinate ITS projects, funding support and other related management activities with local public transit agencies.	Existing
	Traffic Management	Operate TMCs and communicate traffic related information to other agencies.	Existing
		Manage and control roadside equipment (including CCTV, DMS, HAR, detection sensors, signal systems, and others).	Existing/ Planned
		Operate highway-rail preemption and warning systems.	Existing/ Planned
		Operate portable TMCs for special events, etc.	Planned

Stakeholder	Transportation Service	Role/Responsibility	Status
Mississippi Department of Transportation	Traffic Management	Operate speed warning systems.	Planned
		Operate reversible lane management systems.	Planned
		Operate automatic gate closure systems.	Planned
	Traveler Information	Provide real time traffic information through Internet, Kiosks, etc.	Existing/ Planned
		Provide telephone traveler information (511 System) via either cell phone or landline.	Planned
	Transportation Planning and ITS Architecture Management	Coordinate the Mississippi Statewide ITS Architecture development and implementation with stakeholders.	Existing
		Responsible for the maintenance of the Mississippi Statewide ITS Architecture.	Existing
		Provide transportation planning services for state DOT.	Existing
		Coordinate planning activities with the MPOs.	Existing
Federal Motor Carrier Safety Administration (FMCSA)	Commercial Vehicle Operations	Support CVISN Program and coordinate the nationwide deployment.	Existing
International Fuel Tax Association, Inc. (IFTA)	Commercial Vehicle Operations	Allocate fuel taxes between multiple states for motor carrier activities across jurisdictional boundaries, in accordance with the International Fuel Tax Agreement.	Existing
		Coordinate IFTA carrier information and transmittal records between participating states.	Existing
International Registration Plan, Inc. (IRP)	Commercial Vehicle Operations	Support the IRP base state agreement electronically. Streamline the exchange and reconcilement of registration information and fees by (1) enabling jurisdiction to electronically exchange motor carriers and fee information between jurisdictions; (2) providing an electronic remittance netting function with concurrent electronic fund Transfer capability through a central IRP bank; (3) tracking all amounts due to/from a base jurisdiction; (4) provide reports on the information exchanged and netted fees processed.	Existing
National Weather Service	Emergency Management	Provide weather alerts to local responding agencies.	Existing
	Maintenance and Construction Management	Provide weather information to local agencies.	Existing
National Park Service	Traffic Management	Report traffic incidents that occur on the Natchez Trace Parkway and send incident and work zone information to the MDOT.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
National Park Service	Emergency Management	Responds to incidents and provide MDOT with incident data.	Existing
Mississippi Highway Patrol	Commercial Vehicle Operations	Participate in roadside vehicle inspection for law and regulations enforcement.	Existing
		Exchange safety and/or security information with other agencies.	Existing
	Emergency Management	Operate dispatch centers to provide emergency call taking (911, *HP, and Motorist Assistance Call Boxes), and dispatch state patrol vehicles on the jurisdiction roadways.	Existing
		Coordinate emergency response with local emergency agencies.	Existing
		Support disaster response and recovery, and disaster evacuation.	Existing
		Provide disaster-related information to the public	Existing
	Incident Management	Routinely patrol major roadways including interstates, US highways, state highways and secondary county roads, and enforce motor vehicle laws.	Existing
		Receive emergency calls for incidents within the jurisdiction area and dispatch state patrol vehicles responding to emergency calls.	Existing
		Coordinate incident response with local incident response agencies including emergency management, public safety, and/or transportation, including road closure.	Existing
	Traveler Information	Observe/collect road/weather conditions on interstates, US highways, and major state highways.	Existing
Mississippi Department of Public Safety	Traveler Information	Provide online weather/road condition information.	Existing
	Emergency Management	Provide state law enforcement, highway safety, criminal justice, and emergency management.	Existing
Mississippi Department of Public Safety Office of Homeland Security	Emergency Management	Issue homeland security warnings.	Existing
		Coordinate homeland security practices throughout the state.	Existing
Mississippi Department of Public Safety Bureau of Investigation	Emergency Management	Responsible for issuing AMBER Alerts.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
Mississippi Emergency Management Agency (MEMA)	Emergency Management	Provide emergency management center for statewide emergency operations and homeland security practices during major emergencies and disasters.	Existing
		Coordinate with local, state, and federal agencies.	Existing
		Issue nationwide and regional warnings to government authorities and the civilian population in areas endangered by disasters.	Existing
Mississippi Department of Environmental Quality	Emergency Management	Work with MEMA and other agencies to deal with truck or train hazardous material incidents.	Existing
Mississippi Public Service Commission	Archived Data Management	Maintain and provide a SAFETYNET database management system.	Existing
	Commercial Vehicle Operations	Manage motor carrier state application and registration.	Existing
Mississippi State Tax Commission Motor Carrier Division	Archived Data Management	Maintain a database for commercial vehicle tax records.	Existing
	Commercial Vehicle Operations	Manage commercial vehicle taxes including IFTA and IRP.	Existing
Metropolitan Planning Organizations	Archived Data Management	Collect and archive transportation data including traffic counts, accident information, etc.	Planned
	Transportation Planning and ITS Architecture Maintenance	Provide transportation planning and technical assistance services to various agencies within the region, including ITS projects.	Existing
		Coordinate the stakeholders of the Regional ITS Architectures on the architecture implementation.	Existing
		Responsible for the maintenance of the Regional ITS Architectures.	Planned
Urban Transit Agencies	Archived Data Management	Collect and archive transit data.	Existing/ Planned
	Electronic Payment	Operate automatic passenger loading and electronic fare payment system.	Existing/ Planned
	Emergency Management	Support disaster response and recovery, and disaster evacuation.	Existing
	Incident Management	Report incident information to local incident response agencies.	Existing
	Public Transportation	Dispatch fixed-route and demand responsive services to the jurisdiction area.	Existing
		Operate software to support schedule, dispatch operations, and other transit management activities.	Existing
		Provide maintenance on agency vehicle fleet.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
Urban Transit Agencies	Public Transportation	Coordinate with other transit service providers.	Existing/ Planned
		Provide transit signal priority functions at signalized intersections.	Planned
		Operate AVL/GPS system to track vehicle locations.	Existing/ Planned
		Operate security camera systems to monitor transit vehicles.	Planned
	Traveler Information	Provide general transit information such as routes and schedules, transfer options, and fares to travelers.	Existing
		Provide real-time transit information via website, kiosks, on-board display/audio, bus stop electronic display/audio, etc.	Planned
Rural Transit Agencies	Archived Data Management	Collect and archive transit data.	Planned
	Electronic Payment	Operate electronic fare payment system.	Planned
	Emergency Management	Support disaster response and recovery, and disaster evacuation.	Existing
	Incident Management	Report incident information to local incident response agencies.	Existing
	Public Transportation	Dispatch fixed-route and demand responsive services to the jurisdiction area.	Existing/ Planned
		Operate software to support schedule, dispatch operations, and other transit management activities.	Existing/ Planned
		Provide maintenance on agency vehicle fleet.	Existing
		Coordinate with other transit service providers.	Existing/ Planned
		Operate security camera systems to monitor transit vehicles.	Planned
		Operate AVL/GPS system to track vehicle locations.	Planned
	Traveler Information	Provide general transit information such as routes and schedules, transfer options, and fares to travelers.	Existing/ Planned
		Provide real-time transit information via website, kiosks, on-board display/audio, bus stop electronic display/audio, etc.	Planned
Intercity Transit Providers	Public Transportation	Provide fixed-time and demand responsive transit services between cities.	Existing
		Operate AVL/GPS system to track vehicle locations.	Planned
		Coordinate with other transit service providers.	Existing/ Planned

Stakeholder	Transportation Service	Role/Responsibility	Status
Intercity Transit Providers	Traveler Information	Utilize websites, telephone systems, kiosks, etc. to provide transit information.	Existing/ Planned
County Emergency Management Agencies	Emergency Management	Develop countywide emergency management plan addressing preparation, response, recovery and mitigation actions for all potential risks to the public.	Existing
		Provide emergency management center for countywide emergency operations and homeland security practices during major emergencies and disasters.	Existing
		Issue countywide warnings.	Existing
	Incident Management	Coordinate incident response with local incident response agencies.	Existing
County and City Public Safety Agencies	Commercial Vehicle Operations	Participate in roadside vehicle inspection for law and regulation enforcement.	Existing
		Exchange safety and/or security information with other agencies.	Existing
	Emergency Management	Respond to emergency dispatches.	Existing
		Coordinate emergency response with local emergency agencies.	Existing
		Support disaster response and recovery, and disaster evacuation.	Existing
		Provide disaster-related information to the public.	Existing
	Incident Management	Respond to incident dispatches.	Existing
		Responsible for accidents reporting.	Existing
		Coordinate incident response with local incident response agencies including emergency management, public safety, and/or transportation.	Existing
County Engineering and City Public Works	Archived Data Management	Collect and archive transportation data including traffic and maintenance.	Existing/ Planned
	Emergency Management	Coordinate emergency responses with local emergency agencies.	Existing
		Provide resources to support emergency management when requested by emergency agencies.	Existing
		Support disaster response and recovery, and disaster evacuation.	Existing
	Incident Management	Perform incident verification through video surveillance.	Existing/ Planned
		Provide incident information to local incident response agencies including emergency management, public safety, and/or transportation.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
County Engineering and City Public Works	Incident Management	Provide resources to support incident management when requested by local incident response agencies.	Existing
		Coordinate incident response, road closures and detours with local incident response agencies.	Existing
		Operate roadside equipment including portable DMSs for incident management.	Planned
	Maintenance and Construction Management	Provide construction management of county/city roads.	Existing
		Dispatch maintenance vehicles for planned activities (road maintenance, snow/ice removal, etc.) and unplanned incidents within the jurisdiction area.	Existing
		Provide maintenance on agency vehicle fleet.	Existing
		Communicate maintenance and construction schedule and other related information to local agencies.	Existing
		Maintain city roadside equipment.	Existing
		Operate field devices (DMS, CCTV, sensors, intrusion warning device, etc.) for work zone management.	Existing/ Planned
	Traffic Management	Operate roadside equipment (including traffic signal system, DMS, detection sensors, CCTV, or others) within the county jurisdictions.	Existing/ Planned
		Communicate traffic-related information to other agencies.	Existing
		Operate rail crossing control equipment at highway rail intersections	Existing/ Planned
County and City 911 Dispatch Centers	Emergency Management	Provide emergency call taking (911) within the county and/or city jurisdiction area and dispatch Sheriff, Police, Fire and EMS services.	Existing
		Coordinate emergency response with local emergency agencies.	Existing
		Support disaster response and recovery, and disaster evacuation.	Existing
		Provide disaster-related information to the public.	Existing
	Incident Management	Provide emergency call taking for incidents within the county and/or city jurisdiction and dispatch Sheriff, Police, Fire and EMS services to incidents.	Existing
		Coordinate incident response with local incident response agencies including emergency management, public safety, and/or transportation.	Existing

Stakeholder	Transportation Service	Role/Responsibility	Status
County and City Parking Operators	Parking Management	Operate smart parking management system that includes transit information signs and information kiosks.	Planned
Airports	Emergency Management	Coordinate emergency response with local emergency agencies.	Existing
	Incident Management	Coordinate incident response with local incident response agencies.	Existing
	Traveler Information	Provide traveler information.	Existing
Railroad Companies	Traffic Management	Operate and maintain rail roadside equipment communicating with traffic signal systems or other traffic control devices at highway rail intersections.	Existing
Intermodal Rail Facility Companies	Public Transportation	Operate railroad intermodal facilities which transport goods between railroad and other transportation modes including truck and water.	Existing
Private Partnership Toll Facility Operations	Electronic Payment	Collect tolls from drivers using the Airport Parkway and collect and process data collected.	Proposed.
Private Trucking Companies	Commercial Vehicle Operations	Manage company vehicle fleets.	Existing
		Coordinate commercial vehicle management activities with public agencies.	Existing
Port Authorities	Commercial Vehicle Operations	Operate scales to determine cargo weight and related cargo restrictions, fees, etc, and also perform inspections.	Existing
Media Outlets	Traveler Information	Collect travel-related information from the public sector and private information sources, and broadcast that information via TV, radio stations, news media, etc.	Existing

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4. INVENTORY

The Mississippi Statewide ITS Architecture inventory identifies all ITS systems that are being implemented or planned throughout the state of Mississippi. Table 4-1 provides a list of ITS systems, their general descriptions, and associated stakeholders that are involved with or responsible for operations and management of the systems. For a system with multiple stakeholders involved, the stakeholder who is either the principal owner of the system or plays a leading role in operating the system was identified as the primary stakeholder.

Resources and references that have been used in the development of this architecture include the existing Mississippi Statewide ITS Architecture, planning documents (MDOT, MPO, and City), and project study reports. With assistance from the MDOT, an extensive stakeholder survey was conducted to identify existing and future user needs and ITS inventory in the state of Mississippi. The stakeholder survey was distributed to the following stakeholders:

- FHWA
- FMCSA Mississippi Division
- National Park Service
- National Weather Service
- Mississippi DOT Headquarters and District Offices
- Mississippi Department of Public Safety
- Mississippi Highway Patrol Headquarters and District Offices
- Mississippi Department of IT Services
- Mississippi Public Service Commission
- Mississippi Emergency Management Agency Headquarters and District Offices
- Mississippi Planning and Development Districts
- Mississippi Development Authority
- Port Authorities
- Coast Guard
- Regional and Municipal Airports
- Urban and Regional Transit Agencies
- County Emergency Management Agencies / Civil Defense
- County Engineering and City Public Works Departments
- County and City Planning Departments
- County Sheriff Offices and City Police Departments
- City Fire Departments
- Major Railroad Operators
- Universities

The stakeholder survey questionnaire is included in Appendix A.

Table 4-1. Mississippi Statewide ITS Inventory

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	MS Traffic.com	Mississippi DOT website provides real time traffic information (http://www.mstraffic.com/) including traffic conditions, incidents, streaming traffic video, road restrictions, roadway work, alerts, hurricane evacuation information, and other transportation-related information. Clearing house for real time incidents and travel speed information will be established, as well as information on transit service, airport/airline info, and commercial vehicle operation information.	Existing/ Planned	
MDOT	Traveler Information Repository	A 511 system or similar systems that collects traveler information.	Planned	
MDOT	Statewide 511 System	Statewide 511 System will be an integrated statewide service, developed in phases. Initially the system will be implemented in Jackson. It will be connected to bordering states' 511 services where possible and available, and will be available to the traveling public 24 hours per day, 7 days per week.	Planned	
MDOT	MDOT Statewide TMC in Jackson	TMC provides overall planning and implementation of incident management program, assists in incident detection and verification, initiates incident management strategies on affected facilities, controls signals on state routes outside of Jackson, provides traffic control, assists motorists with disabled vehicles, provides motorist information (via HAR and DMS), determines incident clearance and roadway repair needs, establishes and operates alternate routes, dispatches freeway service patrols, dispatches maintenance resources such as dump trucks and sweepers, operates the GoMDOT web server, and shares video and data with City of Jackson TMC, media and police agencies.	Existing/ Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	MDOT Districts Traffic Operation Centers	The District TOCs will operate and maintain the ITS equipment deployed in the six MDOT districts. The District TOCs will also participate in local incident management programs, assist in incident detection and verification (CCTV), initiate traffic management strategies on incident impacted facilities, provide motorist information via HAR, LPFM (Low Power FM Radio), and/or DMS, determine incident clearance and roadway repair needs, establish and operate alternate routes, dispatch maintenance resources such as dump trucks and sweepers. Data, voice, and (possibly) video will be shared with the MDOT's TOC in Jackson, operate the GoMDOT web server, share video and data with Jackson TMC, media and police agencies.	Existing/ Planned	
MDOT	Automatic Truck Rollover Warning System	MDOT is considering installing an automated truck rollover warning system at locations notorious for truck rollover accidents. The system determines the probability that a truck will roll over at different speeds, based on sensing the truck's weight and load characteristics. Although this system cannot prevent all rollover incidents, it will reduce the number of future rollover accidents.	Planned	
MDOT	MDOT Maintenance and Construction Offices	Dispatch maintenance vehicles for planned activities (road maintenance, snow/ice removal, etc.) and unplanned incidents within the jurisdiction area, and communicate maintenance and construction schedule and other related information to other agencies.	Existing	
MDOT	MDOT ExpressPass Oversize/Over-weight Permitting System	The website https://www.expresspass.ms.gov/trucking enables online application and account management of oversize/overweight commercial vehicle permits. Available ExpressPass routes are also provided.	Existing	
MDOT	MDOT PrePass System	PrePass is an automatic vehicle identification system that allows participating transponder equipped commercial vehicles to bypass designated weigh stations and port-of-entry facilities across the United States. The PrePass system has been installed at 12 locations in the state.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	MDOT Weigh-in-Motion Stations	Weigh-in-Motion (WIM) stations measure truck weights and axle configuration for enforcing law and regulations. On-line access to enforcement data at all permanent scale facilities is planned. WIM data is also planned to be available to relevant agencies via the Internet or through a database.	Existing	
MDOT	Commercial Vehicle Traveler Information Network	Provides specific information to truck operators via the Internet and/or public kiosks at truck stops. This might include road closures, incident, weather (i.e., fog, flooding), construction, and special permit routing information.	Planned	
MDOT	Motorist Assistance Call Boxes	MDOT has installed motorist assistance call boxes on I-10 and I-110 along the Gulf Coast. Call boxes permit a traveler involved in an accident or stranded on the roadway to directly contact a responding agency.	Existing	
MDOT	MDOT Highway Service Patrol	Highway service patrol vehicles assist motorists in minor incidents (flat tire, accident, out of gas, etc.) to minimize disruption to the traffic stream. 1-2 vehicles are planned to be deployed around Jackson and will communicate with the MDOT TMC via voice communication. Additional vehicles may be added in Jackson, Gulf Coast, and DeSoto County. AVL will be installed.	Existing/ Planned	
MDOT	MDOT Highway Performance Monitoring System (HPMS)	Highway information system includes data on the extent, condition, performance, use, and operating characteristics of the highways.	Existing	
MDOT	MDOT Accident Database	Maintains records on traffic accidents occurring on public roadways. A Safety Analysis Management System (SAMS) is planned as a Web-based application providing interactive GIS tools to assist in the query, visualization, and analysis of crash data.	Existing/ Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	MDOT Closed Loop Signal Systems	Signal systems including traffic signals, loop detectors, video detection, and communications infrastructure. Signal systems may be operated and maintained by Counties and Cities under joint agreements. Emergency vehicle signal preemption and transit signal priority may be existing or planned at cities or counties.	Existing	Cities and Counties
MDOT	MDOT Portable TMCs	The portable TMCs incorporate speed sensors, surveillance cameras, DMSs and communications equipment on one portable platform. Portable TMCs will be used in construction work zones, routes leading to special events, airports, etc. when there is a need for temporary traffic control. They are planned for MDOT Districts 2, 3 and 6.	Planned	
MDOT	MDOT CCTV	Monitors state major roadways to assist in incident management/emergency management. The CCTV cameras provide the ability to confirm specific conditions (e.g., incidents, lane blockages, congestion) and can aid in dispatching appropriate resources or formulating an appropriate traffic response. CCTV Camera Sites include: 14 in Jackson (25 additional under construction & 10 planned), 8 in Southaven (2 additional planned), 8 on Gulf Coast (6 additional planned), 4 in Columbus, 2 in West Point, 1 in Starkville, 5 in Oxford (under construction), 8 in Hattiesburg (planned), 2 on Miss. River Bridge @ Helena, 2 on Miss. River Bridge @ Greenville, 2 on Miss River Bridge @ Vicksburg (planned-MOU LaDOTD), 2 on Miss River Bridge @ Natchez (planned-MOU LaDOTD). The additional planned projects include: Jackson Area Communications and Surveillance Expansion-The Stack and US 80, Natchez Trace Tower Camera Conversion to Fiber Optic Communications, I-55 & High Street Camera Conversion to Fiber Optic Communications, Fiber Optic Cable Expansion at Industrial Drive Interchange. CCTV is also appropriate for rest areas.	Existing/ Planned	
MDOT	MDOT Traffic Sensors	There are numerous types of traffic sensors to choose from, including in-pavement devices such as the commonly-used inductive loop detector and "non-intrusive" devices, including overhead sensors, including radar and microwave technologies, video image processing systems and acoustic sensors.	Existing/ Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	MDOT Speed Warning System	Includes static speed signs, speed detector (radar), and display system. Key features of the concept include mandatory speed limit signals, automatic and effective enforcement and automatic control of the speed signals.	Planned	
MDOT	MDOT Reversible Lane Management	Manage reversible lane facilities, provide surveillance capabilities, direct wrong-way vehicles, manage right-of-way based on demand changes and special events, and provide special surveillance capabilities to mitigate safety hazards.	Planned	
MDOT	MDOT Dynamic Message Signs	Permanent DMSs are installed at major metro/municipal areas to disseminate information related to traffic incidents, AMBER alerts, special events, and weather conditions. New permanent DMSs are planned at 9 locations in Jackson metro area and 2 locations in Hattiesburg.	Existing/ Planned	
MDOT	MDOT Variable Trailblazer Signs	Variable trailblazer signs form a directionally-oriented signing system on surface streets. This can provide necessary information to bypass heavily congested or closed interstate freeway entrance ramps or segments (for appropriate alternate routes), as well as keep traffic moving towards specific destinations (such as parking lots or special event centers, e.g. Jackson Coliseum). These signs combine route shields or destination symbols with variable directional arrow displays to provide travelers with the necessary directional information to reduce confusion.	Planned	
MDOT	MDOT Portable Dynamic Message Signs	Used to direct traffic for special events, maintenance and construction, and incident management. There are approximately 38 portable CMS units statewide with 12 additional signs under procurement.	Existing/ Planned	
MDOT	MDOT Dynamic Speed Zone Signs	Dynamic signs display speeds of vehicles approaching speed zones.	Planned	
MDOT	Fog Detection Systems	MDOT plans to deploy fog-related detection system in the Gulf Coast region. Information will be transmitted to a local TMC, and then conveyed to motorists via DMS or HAR.	Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	MDOT Highway Advisory Radio (HAR)	Disseminate information to travelers via radio systems. HAR systems installation is planned during roadway and bridge reconstruction / rehabilitation. HAR is also planned to be installed in advance of decision points on high volume / high accident routes and in the vicinity of major attractions, airports, and parking facilities.	Planned	
MDOT	MDOT Weather Sensors	Weather sensors collect pavement temperature, surface temperature, ambient temperature, wind speed and direction, pavement wet/dry, precipitation, and relative humidity. Additional sensors within the urban area may be deployed, and communication links can be established with MDOT sensors in rural areas attracting tourist and other visitor traffic. Together, this provides a network of pavement, visibility and other weather information that could be disseminated through various pre-trip and en-route information means.	Existing/ Planned	
MDOT	Railroad Crossing Control	Deployment of railroad pre-emption and warning systems at at-grade railroad crossings. This process enables signals in the vicinity of the rail crossing to coordinate their timing when a train approaches. The system consists of gates and signals. Train detector circuitry and communication line from intelligent interface controller to wayside interface equipment. The city of Hattiesburg plans to connect traffic signals on Market Street with the railroad grade crossing preemption.	Planned	City of Hattiesburg
MDOT	CVISN Credentialing Infrastructure System	Develop a virtual one-stop shop for all the motor carrier transactions which process credential applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operation. It will provide electronic access for motor carrier credentialing, tax payments and permits. Also, it is planned to provide Mississippi Public Service Commission and MDOT enforcement personnel with real-time safety and credential information. The national CVISN system databases will be connected and accessed, including Commercial Driver's License Information System (CDLIS), Safety and Fitness Electronic Records (SAFER), Motor Carrier Management System (MCMIS), National Law Enforcement Telecommunication System (NLETS), etc.	Existing/ Planned	Mississippi Tax Commission, Mississippi Public Service Commission, IRP, Inc., IFTA, Inc, FMCSA

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
MDOT	Automated Gate Closure System	This system would provide remote-controlled operated gates to close roadways primarily during adverse weather conditions. Implementing technology that will allow the closure (gates to be closed and signs activated as needed) from a remote location such as the County Emergency Operations Center or MDOT TMC can simplify some of the issues surrounding closures. This type of system can be used in conjunction with reversible lane operations, as is currently being discussed between Mississippi and Louisiana officials with respect to I-59.	Planned	
MDOT	MDOT Maintenance Vehicles	Maintenance vehicles that are utilized to support road maintenance, such as salt/sand trucks, and road repair trucks. Once an Automated Vehicle Location (AVL) system is implemented, the equipped maintenance vehicles, service patrol vehicles or buses can serve as traffic probes to provide additional traffic flow data to the ITS systems.	Planned	
Mississippi Bureau of Investigation	Mississippi Bureau of Investigation	Issue AMBER Alerts.	Existing	
Mississippi Department of Environmental Quality	Mississippi Department of Environmental Quality	Work with MEMA and other agencies to deal with truck or train hazardous material incidents.	Existing	
Mississippi Emergency Management Agency	Mississippi Emergency Management Agency	Plan and coordinate with local emergency service providers to respond to threats from technological, man-made and natural origins; activate Emergency Operations Center, allocate resources, and maintain operational control of the State Emergency Response Team, the Mobile Operations Center, the Disaster Reconnaissance Team and the communications/state warning point section.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Mississippi Emergency Management Agency	MEMA Emergency Operations Center	The State Emergency Operations Center provides emergency management functions for statewide emergency operations and homeland security practices during major emergencies and disasters, and coordinates with local, state, and federal agencies. The center alerts state and local officials to all natural or man-made incidents throughout the state. Communications include satellite, low band and UHF radios. A computerized alphanumeric paging system allows for rapid notification of all MEMA personnel as well as personnel in 78 counties. A high-speed digital fax system has enhanced the ability to rapidly communicate essential information to the field. Emergency management software for recording disaster/incident information is also used.	Existing	
Mississippi Department of Public Safety	Mississippi Road/Weather Conditions Website	Provides weather/road conditions for the entire state. The website is at http://www.dps.state.ms.us/dps/dps.nsf/roadmap?OpenForm.	Existing	
Mississippi Highway Patrol	Mississippi Highway Patrol (MHP) Central/District Offices	Enforce traffic laws on state highways within 9 districts; assist local law enforcement agencies and responding to statewide emergencies.	Existing	
Mississippi Highway Patrol	*HP Cellular Phone System	Receive incident/emergency calls from travelers who use cellular *HP.	Existing	
Mississippi Highway Patrol	MHP Dispatch Centers	Receive incident/emergency calls, and utilize CAD system to dispatch emergency vehicles. CAD incident data and camera images will be shared between MHP dispatch centers and MDOT TMC.	Existing	
Mississippi Highway Patrol	MHP Emergency Vehicles	Emergency vehicles responding to dispatch. AVL is planned.	Existing/ Planned	
Mississippi Office of Homeland Security	Mississippi Office of Homeland Security	Coordinate, maintain and administer homeland security practices within the state.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Mississippi Public Service Commission Motor Carrier Division	Mississippi Public Service Commission SAFETYNET	A database management system that allows entry, access, analysis, and reporting of data from driver/vehicle inspections, crashes, compliance reviews, assignments, and complaints.	Existing	
Mississippi Tax Commission	Commercial Vehicle Databases	A database for commercial vehicle tax records.	Existing	
Metropolitan Planning Organizations	MPO Databases	Databases for all transportation related data in the MPO regions.	Existing	
Urban Transit Agencies	Urban Transit Systems	Provide fixed-time and demand responsive transit services within the urbanized areas. Jackson Public Transportation Corporation (JATRAN) has deployed Multisystems CAD dispatch, Genfare Smartcard, and AVL systems. Mississippi State University Campus Transit System has installed AVL system. ITS systems (including CAD dispatch, AVL/GPS, electronic payment, pre-trip planning, electronic signs and/or voice annunciations on buses or at stops, website, kiosks, and signal priority) may be planned at JATRAN and other urban transit agencies.	Existing/ Planned	
Rural Transit Agencies	Rural Transit Systems	Provided fixed-time and demand responsive transit services within rural areas and/or small cities. ITS equipment may be installed or planned to be installed, including CAD, automated maintenance scheduling, on-board security cameras, AVL, on-board display/audio, electronic payment system, etc.	Existing/ Planned	
Intercity Transit Providers	Intercity Transit Systems	Provide fixed-time and demand responsive transit services between cities. AVL is planned.	Existing/ Planned	
Intercity Transit Providers	Intercity Transit Traveler Information Systems	Utilize websites, telephone systems, kiosks, etc. to provide transit information such as transit routes and schedules, transit transfer options, transit fares, etc.	Existing/ Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Transit Service Providers	Multimodal Transit Centers	Union Station Transfer Center in Jackson will be converted to a multi-transit center housing Jackson Transit, AMTRAK, Greyhound, rural providers, and taxis. Information and Operations will be integrated. This hub will be the first deployment of "Jackson Traveler Information Center". Two similar facilities in Biloxi and Gulfport will also house all regional transit operators including Coast, Greyhound, Taxi, and Casino Park and Ride.	Existing/ Planned	
Counties and Cities	County and City Databases	Maintain/archive county or city data for a variety of uses and operates similar to a data clearinghouse.	Existing	
County Engineering and City Public Works	City/County Traffic Management Centers	Manage and control traffic signals, CCTVs, DMSs, detection sensors, and other roadside equipment within the jurisdiction for traffic control and management, and communicate traffic related information to other agencies. Such TMCs include: Jackson TMC, Ridgeland TMC (planned), Southaven Combined Regional Center in Police Headquarters, Columbus Traffic Operations Center in Police Headquarters, Hattiesburg Regional Center/Emergency Operations Center (planned for District 6 Headquarters), Gulfport Traffic Operations Center (planned for Project Office), Oxford Traffic Operations Center (planned in the City Electric Building).	Existing/ Planned	
County Engineering and City Public Works	County and City Traffic Signals and Field Equipment	Signals and equipment maintained and operated by cities and counties. An example is Jackson Traffic Signal System and Video Surveillance maintained by City of Jackson Public Works. Tunica County Sheriff's Department is planning to install surveillance cameras at master intersections in the county.	Existing/ Planned	
County Engineering and City Public Works	County and City Maintenance and Construction Offices	Dispatch maintenance vehicles for planned activities (road maintenance, snow/ice removal, etc.) and unplanned incidents within the jurisdiction area, and communicate maintenance and construction schedule and other related information to other agencies.	Existing/ Planned	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
County Engineering and City Public Works	County and City Maintenance and Construction Field Devices	Sensors, cameras, and/or DMSs for monitoring and controlling maintenance and work zone activities.	Planned	
County and City Parking Operators	Smart Parking Systems	Smart parking systems will include transit information signs, information kiosks during parking facility/garage construction.	Planned	
County Emergency Management Agencies	County Emergency Operation Centers	Provide emergency management center for countywide emergency operations and homeland security practices during major emergencies and disasters.	Existing/ Planned	
County and City 911 Dispatch Centers	County and City Sheriff, Police, Fire and EMS 911 Dispatch Centers	Receive 911 calls, and dispatch sheriff, police, fire and EMS within the jurisdiction via communication system. Exchange mutual aid and incident information with other local agencies. CAD dispatch may be equipped.	Existing	
County and City 911 Dispatch Centers	County and City Sheriff, Police, Fire and EMS Vehicles	A collection of emergency vehicles responding to emergency/incident dispatches. Vehicles may be equipped with communication system, signal preemption, in-vehicle navigation system, mobile data terminals, AVL/GPS, etc.	Existing	
County and City 911 Dispatch Centers	Emergency Response Performance Information	Review of emergency response times (from accident scene to hospitals)	Existing	
Airports	Regional Airport Information Systems	Receive important traveler, weather, and construction information from other agencies, and coordinate with emergency management.	Existing	
Port Authority	Port Authority Facilities	Use scales to determine cargo weight and related cargo restrictions, fees, etc, and also perform inspection.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
	Port Authority Freight Data Systems	Database system recording related freight information.	Existing	
Intermodal Rail Facilities	Intermodal Rail Freight Facility	Represent railroad intermodal facilities which transport goods between railroad and other transportation modes including truck and water. The terminals coordinate freight movement with fleet-freight management, gather information on traffic conditions, and to provide information on intermodal freight activities that is pertinent to traffic movement in the surrounding area.	Existing	
National Weather Service	National Weather Service Information	The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.	Existing	
National Park Service	National Park Service Center Natchez Trace Parkway	The National Park Service Center for Natchez Trace Parkway reports traffic incidents that occur on the parkway. The center will also send incident and work zone information to MDOT Statewide TMC. Public safety services are also represented in this element through the park police that respond to emergencies on the parkway.	Existing	
Private Partnership Toll Facility Operations	Toll Administration	The entity that manages the operation of tolling operations on the proposed Airport Parkway.	Planned	
	Toll Operation	The toll collection facility for the proposed Airport Parkway as well as all equipment used to validate toll payment and process the data for use by MDOT and other entities.	Planned	
Private Trucking Companies	Private Trucking Companies	Own and manage commercial fleets of vehicles.	Existing	
Private Trucking Companies	Private Trucking Companies Commercial Vehicles	Commercial vehicle equipped with the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations.	Existing	

Primary Stakeholder	System	Description	Status	Other Associated Stakeholder
Railroad Companies	Railroad Wayside Equipment	Rail roadside equipment communicating with traffic signal systems or other traffic control devices at highway rail intersections.	Existing	
Railroad Companies	Rail Company Operations Centers	Coordinate with traffic management centers, and provide train schedules, maintenance schedules, and any other forecast events that will result in highway-rail intersection (HRI) closures. The information is used to develop forecasts of highway rail intersection closure times and durations that may be used in advanced traffic control strategies or to enhance the quality of traveler information.	Existing	
Neighboring States	Neighboring State DOT Traffic Offices	Coordinate traffic control and information with Mississippi DOT District offices.	Existing	
Neighboring States	Neighboring State County and City Traffic Control Centers	Coordinate traffic control and information with Mississippi local agencies within regions along the state border, such as Memphis Area traffic control centers in Tennessee.	Existing	
Neighboring States	Neighboring State Highway Patrol Dispatch Centers	Receive 911 calls, and dispatch patrol vehicles, fire and EMS via communication system. Exchange mutual aid and incident information with MHP.	Existing	
Neighboring States	Neighboring State Emergency Management Centers	Coordinate emergency management with MEMA.	Existing	
Local Traffic Generators	Event Promoters and Traffic Generators	Sharing knowledge of events (date, time, location, duration, etc.) that may impact travel on roadways with MDOT TOC, Jackson TMC and emergency service providers.	Existing	
Media Outlets	Media	Provide traffic reports on travel conditions, traffic and travel advisory, incident and special events and other transportation related news services to the traveling public through radio, TV and other media.	Existing	

Figures 4-1 to 4-4 illustrate the locations of some ITS elements throughout the state:

- Figure 4-1: Mississippi Statewide Transportation Framework
- Figure 4-2: Mississippi DOT Weigh Scale Locations
- Figure 4-3: Mississippi DOT Automatic Traffic Recorder Locations
- Figure 4-4: Mississippi DOT website(www.mstraffic.com) CCTV Locations

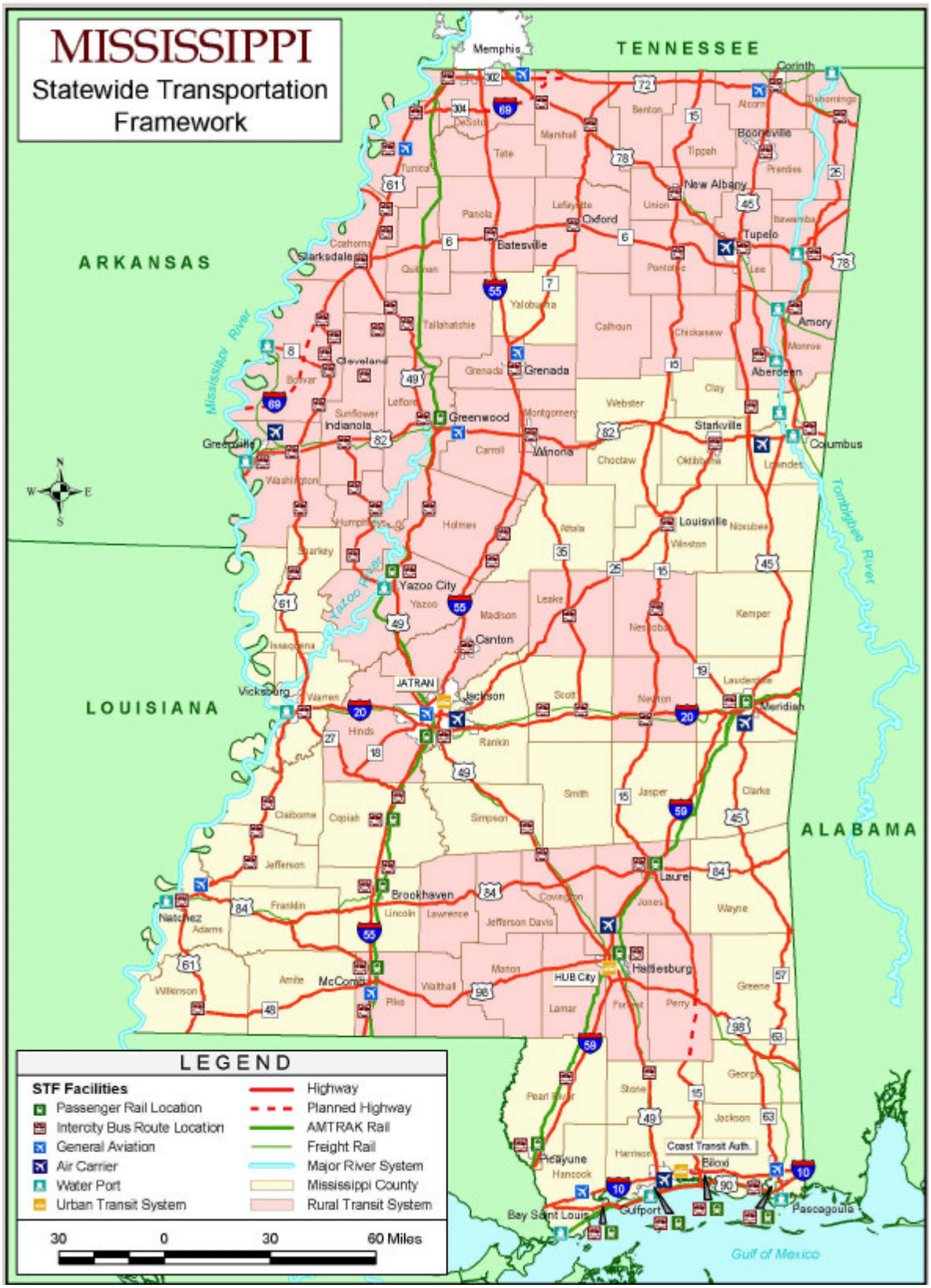

Figure 4-1. Mississippi Statewide Transportation Framework

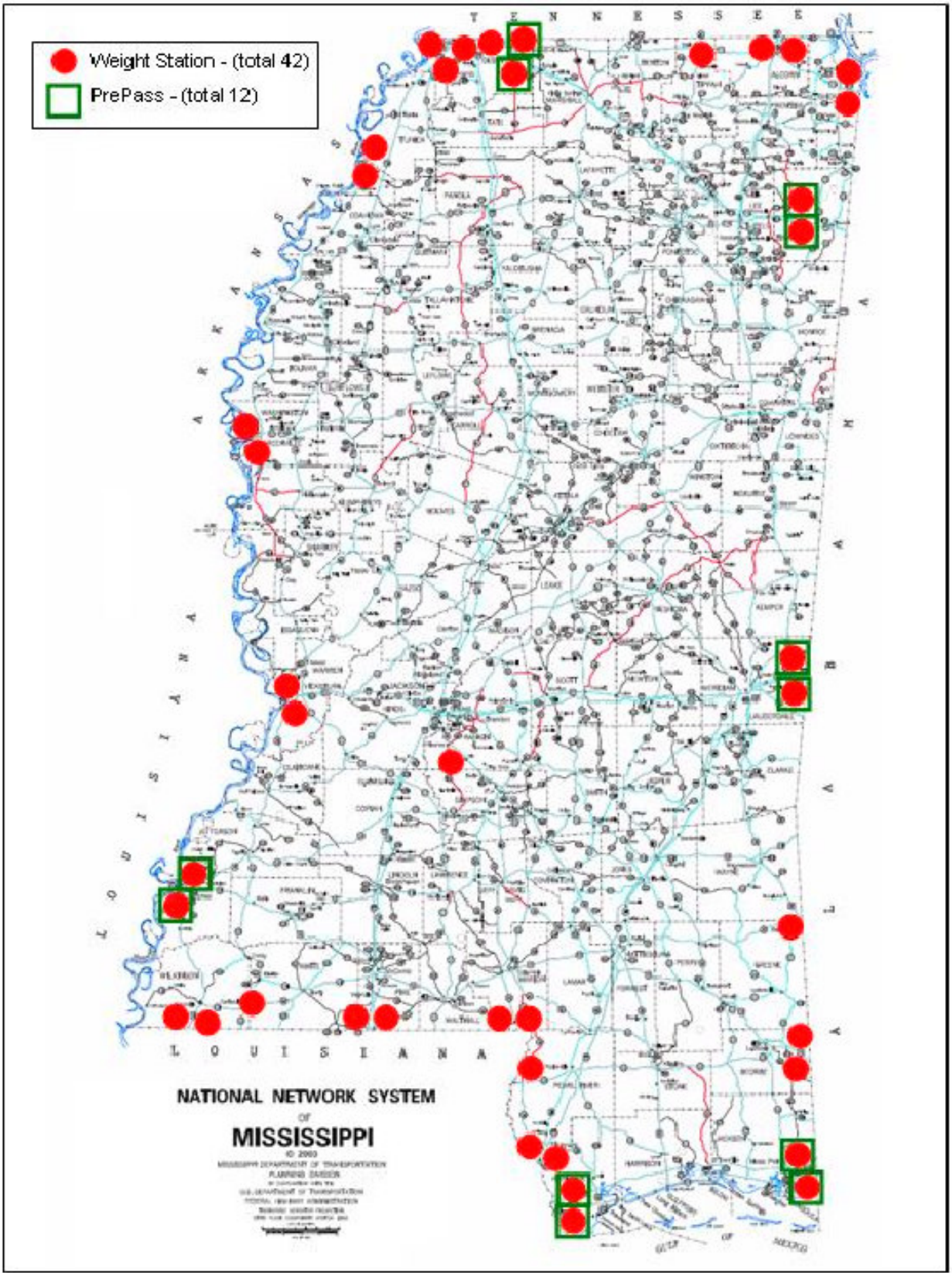

Figure 4-2. Mississippi DOT Weigh Scale Locations

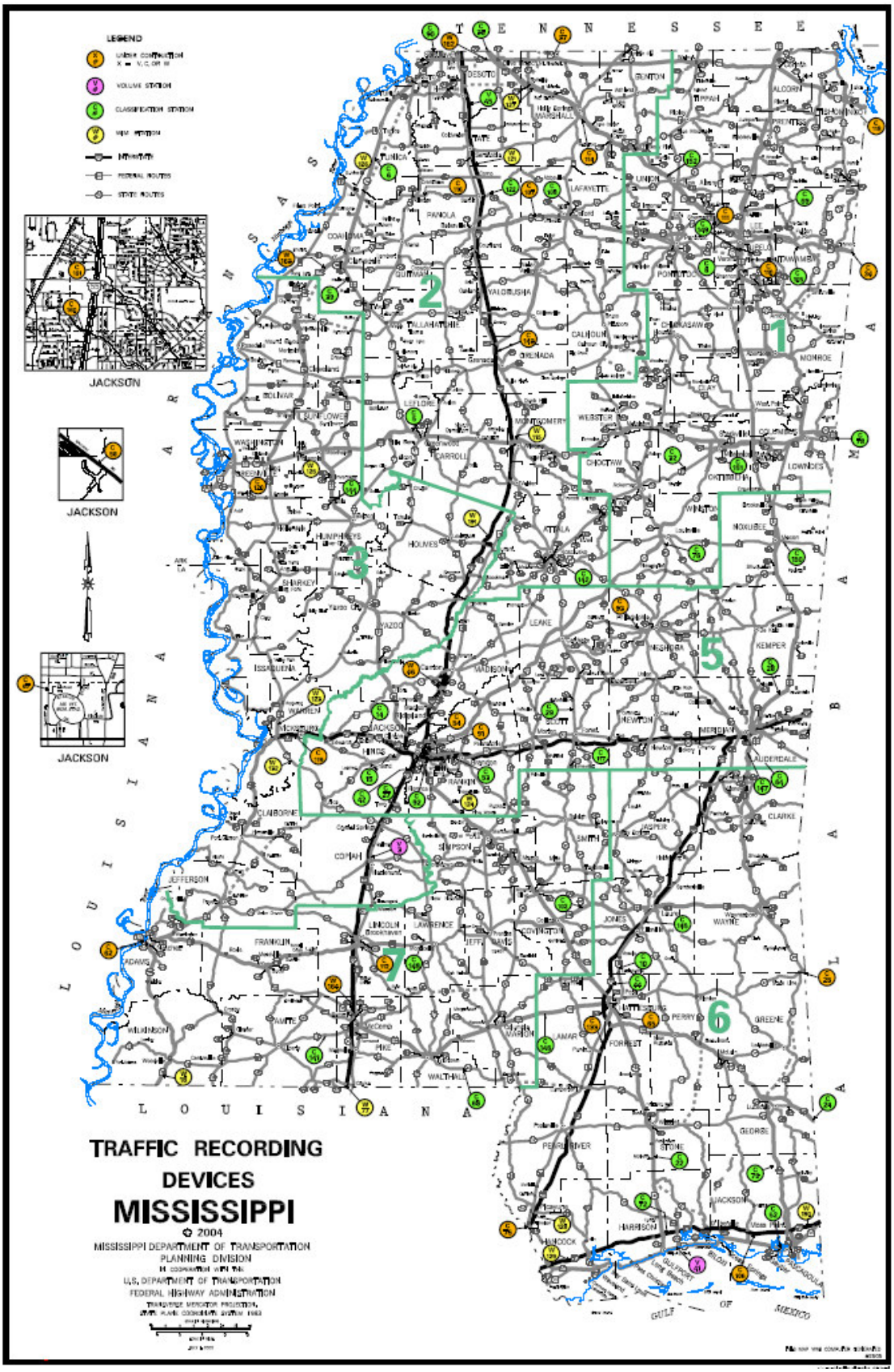

Figure 4-3. Mississippi DOT Automatic Traffic Recorder Locations

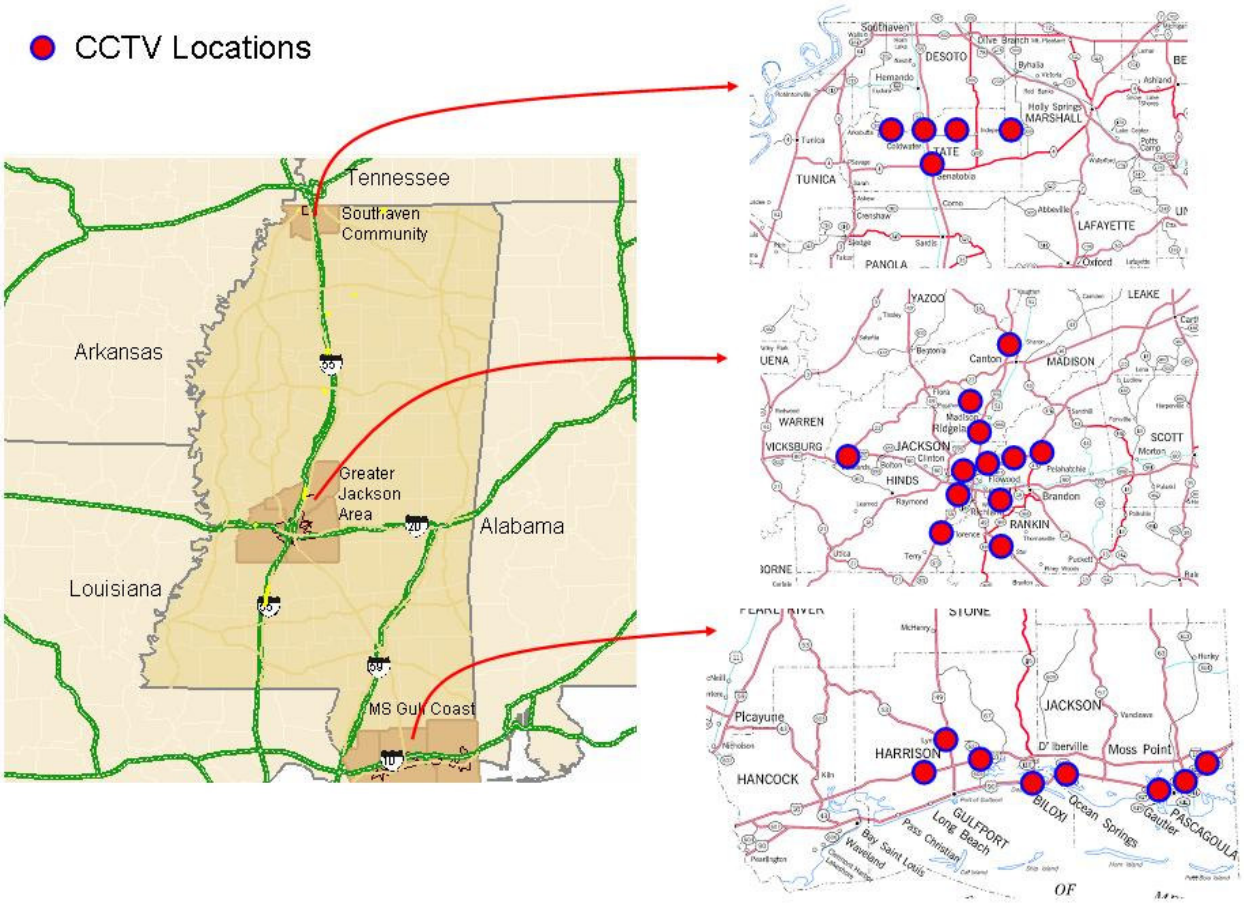

Figure 4-4. Mississippi DOT Website (www.mstraffic.com) CCTV Locations

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5. USER SERVICES AND MARKET PACKAGES

5.1 Identification of User Services

User services describe what should be provided from the user's perspective. Identification of user services highlights the problems with transportation systems and the associated needs of stakeholders and assists in selecting market packages which should support the locally applicable user services. The National ITS Architecture defines thirty-three user services covering a wide breadth of surface transportation needs. Since many of the user service share common infrastructure elements, such as communications, they have been grouped together into eight "bundles" of services, including:

- Travel and Traffic Management
- Public Transportation Management
- Electronic Payment
- Commercial Vehicle Operations
- Emergency Management
- Advanced Vehicle Safety Management
- Information Management
- Maintenance and Construction Management

Based upon the information obtained from the ITS inventory, stakeholder surveys, existing Statewide ITS Architectures and planning documents, the user services applicable to the Mississippi Statewide ITS Architecture have been identified. Table 5-1 presents a complete list of user services in the National ITS Architecture. It also highlights the user services that are applicable to the Mississippi Statewide ITS Architecture. Definitions of user services can be obtained via the National ITS Architecture website at http://itsarch.iteris.com/itsarch/. Among the 23 applicable user services, the top 10 user services, identified below, are the most critical for mitigating transportation problems and issues in the respondents' respective jurisdictions according to the stakeholder survey:

- Emergency Notification and Personal Security
- Disaster Response and Evacuation
- Incident Management
- Traffic Control
- En-route Driver Information
- Emergency Vehicle Management
- Route Guidance
- Highway Rail Intersection
- Hazardous Materials Security and Incident Response
- Traveler Services Information

Table 5-1. List of User Services for Mississippi

User Service Bundle	User Service
1. Travel and Traffic Management	1.1 Pre-Trip Information
	1.2 En-Route Driver Information
	1.3 Route Guidance
	1.4 Ride Matching and Reservation
	1.5 Traveler Services Information
	1.6 Traffic Control
	1.7 Incident Management
	1.8 Travel Demand Management
	1.9 Emissions Testing and Mitigation
	1.10 Highway Rail Intersection
2. Public Transportation Management	2.1 Public Transportation Management
	2.2 En-Route Transit Information
	2.3 Personalized Public Transit
	2.4 Public Travel Security
3. Electronic Payment	3.1 Electronic Payment Services
4. Commercial Vehicle Operations	4.1 Commercial Vehicle Electronic Clearance
	4.2 Automated Roadside Safety Inspections
	4.3 On-board Safety and Security Monitoring
	4.4 Commercial Vehicle Administration Processes
	4.5 Hazardous Material Security and Incident Response
	4.6 Freight Mobility
5. Emergency Management	5.1 Emergency Notification and Personal Security
	5.2 Emergency Vehicle Management
	5.3 Disaster Response and Evacuation
6 Advanced Vehicle Safety Systems	6.1 Longitudinal Collision Avoidance
	6.2 Lateral Collision Avoidance
	6.3 Intersection Collision Avoidance
	6.4 Vision Enhancement for Crash Avoidance
	6.5 Safety Readiness
	6.6 Pre-Crash Restraint Deployment
	6.7 Automated Vehicle Operation
7 Information Management	7.1 Archived Data
8 Maintenance and Construction Management	8.1 Maintenance and Construction Operations

Note: User services shown as gray indicate that they are not applicable to the Mississippi Statewide ITS Architecture.

As mentioned previously, a series of stakeholder meetings was held in Batesville, Hattiesburg, and Jackson in July and September 2006. By bringing together agencies and stakeholders throughout the state including MDOT, County/City traffic engineering departments, public safety, transit, planning, and other agencies, common themes and user needs were discovered that can be addressed on a statewide basis. One of the recurring themes throughout the state was the need for a common communication system for law enforcement and rescue agencies to readily exchange information during and after a crisis. It was repeatedly stated that police and rescue agencies could not coordinate their efforts after Hurricane Katrina due to disparate radio systems. While the state is making an effort to deploy a standard radio system through a legislative task force, this migration will likely only benefit state agencies. Local agencies would still be without a standard communications system.

An additional theme that was discussed was the great potential of the www.mstraffic.com website, which is managed by MDOT. Currently, MHP and MDOT do not always coordinate their transportation incident notification and response plans. This results in MDOT being unaware of crashes, and subsequently, real-time crash data is not available on the website. Also, MHP indicated that the public frequently calls their headquarters for information on crashes. This seems largely due to the fact that the public is unaware of the existence of the website. As more people learn of the availability of real-time traffic information through the Internet, it is important to provide data that is complete and current. This will require increased coordination and communication between MHP and MDOT to ensure that both agencies are aware of a situation at any given time.

5.2 Mapping User Services to Market Packages

Market packages provide an accessible, deployment-oriented perspective to the National ITS Architecture. They are tailored to fit—separately or in combination—real world transportation problems and needs. Market packages enable transportation planners and decision makers to determine appropriate ITS services that satisfy local and statewide needs. Market packages are comprised of one or more equipment packages that work together to deliver a given transportation service and the architecture flows that connect them and other important external systems. In other words, they identify the pieces of the Physical Architecture that are required to implement a particular transportation service.

As illustrated in Table 5-2, all eight-five (85) market packages (in National ITS Architecture Version 5.1) were considered for their applicability to all thirty-three (33) user services. The user services, market packages and associated mapping relationships, which are applicable for the Mississippi Statewide ITS Architecture, have been identified through the mapping exercise.

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Table 5-2. User Services Mapping to Market Packages

	Market Packages: The market packages provide an accessible, deployment-oriented perspective to the national architecture. They are tailored to fit - separately or in combination - real world transportation problems and needs. Market packages collect one or more Equipment Packages that must work together to deliver a given transportation service and the Architecture Flows that connect them and other important external systems. In other words, they identify the pieces of the Physical Architecture that are required to implement a particular transportation service.	1.1 Pre-Trip Travel Information	1.2 En-Route Driver Information	1.3 Route Guidance	1.4 Ride Matching And Reservation	1.5 Traveler Services Information	1.6 Traffic Control	1.7 Incident Management	1.8 Travel Demand Management	1.9 Emissions Testing And Mitigation	1.10 Highway Rail Intersection	2.1 Public Transportation Management	2.2 En-route Transit Information	2.3 Personalized Public Transit	2.4 Public Travel Security	3.1 Electronic Payment Services	4.1 Commercial Vehicle Electronic Clearance	4.2 Automated Roadside Safety Inspection	4.3 On-board Safety And Security Monitoring	4.4 Commercial Vehicle Administrative Processes	4.5 Hazardous Materials Security And Incident Response	4.6 Freight Mobility	5.1 Emergency Notification And Personal Security	5.2 Emergency Vehicle Management	5.3 Disaster Response And Evacuation	6.1 Longitudinal Collision Avoidance	6.2 Lateral Collision Avoidance	6.3 Intersection Collision Avoidance	6.4 Vision Enhancement For Crash Avoidance	6.5 Safety Readiness	6.6 Pre-crash Restraint Deployment	6.7 Automated Vehicle Operation	7.1 Archived Data	8.1 Maintenance And Construction Operations
AD	**ITS Data Mart**																																	X	
AD	**ITS Data Warehouse**																																	X	
AD	ITS Virtual Data Warehouse																																	X	
APTS	**Transit Vehicle Tracking**											X	X		X																				
APTS	**Transit Fixed Route Operations**											X																							
APTS	**Demand Response Transit Operations**											X		X																					
APTS	**Transit Passenger and Fare Management**								X			X				X																			
APTS	**Transit Security**											X			X																				
APTS	**Transit Maintenance**											X																							
APTS	**Multi--Modal Coordination**						X					X																							
APTS	**Transit Traveler Information**											X	X			X																			
ATIS	**Broadcast Traveler Information**	X	X																																
ATIS	**Interactive Traveler Information**	X	X		X	X		X								X																			
ATIS	Autonomous Route Guidance			X																															
ATIS	Dynamic Route Guidance			X		X																													
ATIS	ISP Based Route Guidance	X		X																															
ATIS	Integrated Transportation Management/Route Guidance	X		X																															
ATIS	Yellow Pages and Reservation	X				X										X																			
ATIS	Dynamic Ridesharing				X				X					X																					
ATIS	In-Vehicle Signing		X																																
ATMS	**Network Surveillance**						X	X																											
ATMS	Probe Surveillance						X																												
ATMS	**Surface Street Control**						X	X			X																								
ATMS	**Freeway Control**						X	X																											
ATMS	HOV Lane Management						X		X																										
ATMS	**Traffic Information Dissemination**		X				X	X																											
ATMS	**Regional Traffic Control**						X																												
ATMS	**Traffic Incident Management System**							X																		X	X								
ATMS	Traffic Forecast and Demand Management						X		X																										
ATMS	**Electronic Toll Collection**								X							X																			
ATMS	Emissions Monitoring and Management								X	X																									
ATMS	Virtual TMC an Smart Probe Data		X				X																												X
ATMS	**Standard Railroad Grade Crossing**										X																								
ATMS	**Advanced Railroad Grade Crossing**										X																								
ATMS	Railroad Operations Coordination										X																								
ATMS	**Parking Facility Management**															X																			
ATMS	Regional Parking Management								X																										
ATMS	**Reversible Lane Management**						X																												
ATMS	**Speed Monitoring**						X																												X
ATMS	Drawbridge Management						X																												
ATMS	**Roadway Closure Management**						X	X			X												X		X										
AVSS	Vehicle Safety Monitoring																													X					
AVSS	Driver Safety Monitoring																													X					
AVSS	Longitudinal Safety Warning																										X			X					
AVSS	Lateral Safety Warning																											X		X					
AVSS	Intersection Safety Warning																												X	X					
AVSS	Pre-Crash Restraint Requirement																														X				
AVSS	Driver Visibility Improvement																															X			
AVSS	Advanced Vehicle Longitudinal Control																										X								
AVSS	Advanced Vehicle Lateral Control																											X							
AVSS	Intersection Collision Avoidance																												X						
AVSS	Automated Highway System																																	X	
CVO	Fleet Administration																					X													
CVO	Freight Administration																					X													
CVO	**Electronic Clearance**															X			X																
CVO	**CV Administrative Processes**															X			X		X														
CVO	International Border Electronic Clearance															X			X		X														
CVO	**Weigh In Motion**															X																			
CVO	**Roadside CVO Safety**															X	X				X														
CVO	On-board CVO and Freight Safety & Security																	X																	
CVO	CVO Fleet Maintenance																X	X			X														
CVO	HAZMAT Management																			X	X	X	X												
CVO	**Roadside HAZMAT Security Detection and Mitigation**																			X	X														
CVO	CV Driver Security Authentication																	X		X															
CVO	Freight Assignment Tracking																	X		X	X														
EM	**Emergency Call-Taking and Dispatch**																			X			X												
EM	**Emergency Routing**			X			X																X												
EM	Mayday and Alarms Support																					X													
EM	**Roadway Service Patrols**																						X												
EM	**Transportation Infrastructure Protection**																					X													
EM	**Wide-Area Alert**																					X													
EM	**Early Warning System**																							X											
EM	**Disaster Response and Recovery**																							X											
EM	**Evacuation and Reentry Management**																							X											
EM	**Disaster Traveler Information**																							X											
MCO	**Maintenance and Construction Vehicle and Equipment Tracking**																																		X
MCO	**Maintenance and Construction Vehicle Maintenance**																																		X
MCO	**Road Weather Data Collection**																																		X
MCO	**Weather Information Processing and Distribution**	X																																	X
MCO	Roadway Automated Treatment																																		X
MCO	**Winter Maintenance**																																		X
MCO	**Roadway Maintenance and Construction**																																		X
MCO	**Work Zone Management**																																		X
MCO	**Work Zone Safety Monitoring**																																		X
MCO	**Maintenance and Construction Activity Coordination**																						X												X

Note: Items colored in Gray indicated that the items are not applicable to the Mississippi Statewide ITS Architecture.

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Table 5-3 presents a list of market packages that are identified through the mapping process in Table 5-2. The market packages are grouped according to the type of ITS category they fall under, i.e., Archived Data Management, Advanced Public Transportation Systems, etc. As illustrated in Table 5-3, some of the market packages do not specifically address the user services identified for the Mississippi Statewide ITS Architecture, and they are not applicable to the implementation of the existing and proposed ITS systems in Mississippi. Therefore, a customization of the market packages is necessary so that the market packages that are inappropriate for the Mississippi Statewide ITS Architecture are eliminated. Descriptions of the market packages can be found via the National ITS Architecture website at http://itsarch.iteris.com/itsarch/.

Table 5-3. List of Market Packages for Mississippi Statewide ITS Architecture

Category	Market Package	Market Package Name	Status
Archived Data Management (AD)	AD1	ITS Data Mart	Existing
	AD2	ITS Data Warehouse	Existing
Advanced Public Transportation Systems (APTS)	APTS01	Transit Vehicle Tracking	Existing
	APTS02	Transit Fixed Route Operations	Existing
	APTS03	Demand Response Transit Operations	Existing
	APTS04	Transit Passenger and Fare Management	Existing
	APTS05	Transit Security	Planned
	APTS06	Transit Maintenance	Existing
	APTS07	Multi-Modal Coordination	Planned
	APTS08	Transit Traveler Information	Existing
Advanced Traveler Information Systems (ATIS)	ATIS01	Broadcast Traveler Information	Existing
	ATIS02	Interactive Traveler Information	Planned
Advanced Traffic Management Systems (ATMS)	ATMS01	Network Surveillance	Existing
	ATMS03	Surface Street Control	Existing
	ATMS04	Freeway Control	Planned
	ATMS06	Traffic Information Dissemination	Planned
	ATMS07	Regional Traffic Control	Existing
	ATMS08	Traffic Incident Management System	Existing
	ATMS10	Electronic Toll Collection	Planned
	ATMS13	Standard Railroad Grade Crossing	Existing
	ATMS14	Advanced Railroad Grade Crossing	Planned
	ATMS16	Parking Facility Management	Planned
	ATMS18	Reversible Lane Management	Planned
	ATMS19	Speed Monitoring	Planned
	ATMS21	Roadway Closure Management	Planned
Commercial Vehicle Operations (CVO)	CVO03	Electronic Clearance	Existing
	CVO04	CV Administrative Processes	Existing
	CVO06	Weigh In Motion	Existing
	CVO07	Roadside CVO Safety	Existing

Category	Market Package	Market Package Name	Status
	CVO11	Roadside HAZMAT Security Detection and Mitigation	Planned
Emergency Management (EM)	EM01	Emergency Call-Taking and Dispatch	Existing
	EM02	Emergency Routing	Existing
	EM04	Roadway Service Patrols	Planned
	EM06	Wide-Area Alert	Existing
	EM07	Early Warning System	Existing
	EM08	Disaster Response and Recovery	Existing
	EM09	Evacuation and Reentry Management	Existing
	EM10	Disaster Traveler Information	Existing
Maintenance & Construction Management (MC)	MC01	Maintenance and Construction Vehicle and Equipment Tracking	Planned
	MC02	Maintenance and Construction Vehicle Maintenance	Existing
	MC03	Road Weather Data Collection	Planned
	MC04	Weather Information Processing and Distribution	Planned
	MC06	Winter Maintenance	Planned
	MC07	Roadway Maintenance and Construction	Planned
	MC08	Work Zone Management	Planned
	MC09	Work Zone Safety Monitoring	Planned
	MC10	Maintenance and Construction Activity Coordination	Existing

5.3 Customization of Market Packages

Market packages, customized for the specific requirements of each stakeholder, represent the information that will be exchanged between specific stakeholder elements. The above market packages selected for the Mississippi Statewide ITS Architecture were customized to correspond with the existing ITS system elements and operations as well as future deployment and planned operations. Customization of market packages requires tailoring the elements (subsystems or terminators) in these market packages, along with associated architecture flows. In addition, architecture flows deemed by the stakeholders as not relevant to the deployment need to be removed. The results of such customization are summarized in terms of ITS elements and their deployment status as presented in Table 5-4. Completed results of the customization are detailed in the Turbo Architecture database.

Table 5-4. List of Market Packages by Architecture Elements

Market Package	Market Package Name	Associated Element	Status
AD1	ITS Data Mart	County and City 911 Dispatch Centers	Existing
		County and City Databases	Existing
		County and City Maintenance and Construction Offices	Existing
		County and City TMCs	Existing
		County and City Smart Parking Systems	Planned

Market Package	Market Package Name	Associated Element	Status
		County and City TMCs Roadside Equipment	Existing
		County Emergency Operations Centers	Existing
		Emergency Response Performance Information	Existing
		Mississippi Public Service Commission SAFETYNET	Existing
		Mississippi State Tax Commission CV Databases	Existing
		Port Authority Freight Data Systems	Existing
AD2	ITS Data Warehouse	County and City Databases	Existing
		MDOT Accident Database	Existing
		MDOT CVISN Credentialing Infrastructure System	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT ExpressPass Permitting System	Existing
		MDOT Fog Detection Systems	Planned
		MDOT Highway Performance Monitoring System (HPMS)	Existing
		MDOT Maintenance and Construction Offices	Existing
		MDOT Traffic Sensors	Existing
		MDOT Weather Sensors	Planned
		MHP Central and District Offices	Existing
		MHP Dispatch Centers	Existing
		MPO Databases	Existing
		Multimodal Transit Centers	Planned
		Regional Airport Information Systems	Existing
		Rural Transit Systems	Existing
		Urban Transit Systems	Existing
APTS1	Transit Vehicle Tracking	Intercity Transit Systems	Planned
		Intercity Transit Systems Transit Vehicles	Planned
		Multimodal Transit Centers	Planned
		Rural Transit Systems	Planned
		Rural Transit Systems Transit Vehicles	Planned
		Urban Transit Systems	Existing
		Urban Transit Systems Transit Vehicles	Existing
APTS2	Transit Fixed-Route Operations	Multimodal Transit Centers	Planned
		Rural Transit Systems	Existing
		Rural Transit Systems Transit Vehicles	Existing
		Urban Transit Systems	Existing
		Urban Transit Systems Transit Vehicles	Existing
APTS3	Demand Response Transit Operations	Rural Transit Systems	Existing
		Rural Transit Systems Transit Vehicles	Existing
		Urban Transit Systems	Existing
		Urban Transit Systems Transit Vehicles	Existing
APTS4	Transit Passenger and Fare Management	Multimodal Transit Centers	Planned
		Multimodal Transit Centers Kiosks	Planned
		Rural Transit Systems	Planned
		Rural Transit Systems Transit Vehicles	Planned
		Traveler Card	Existing
		Urban Transit Systems	Existing
		Urban Transit Systems Kiosks	Existing
		Urban Transit Systems Transit Vehicles	Existing
APTS5	Transit Security	Multimodal Transit Centers	Planned
		Rural Transit Systems	Planned
		Rural Transit Systems Transit Vehicles	Planned
		Urban Transit Systems	Planned
		Urban Transit Systems Transit Vehicles	Planned

Market Package	Market Package Name	Associated Element	Status
APTS6	Transit Maintenance	Rural Transit Systems	Existing
		Rural Transit Systems Transit Vehicles	Planned
		Urban Transit Systems	Existing
		Urban Transit Systems Transit Vehicles	Existing
APTS7	Multi-modal Coordination	County and City TMCs	Planned
		County and City TMCs Roadside Equipment	Planned
		Intercity Transit Systems	Planned
		MDOT Closed Loop Signal System	Planned
		MDOT Statewide TMC	Planned
		Multimodal Transit Centers	Planned
		Other Transit Service Providers	Planned
		Rural Transit Systems	Planned
		Urban Transit Systems	Planned
		Urban Transit Systems Transit Vehicles	Planned
APTS8	Transit Traveler Information	County and City Smart Parking Systems	Planned
		Intercity Transit Systems	Existing
		Intercity Transit Traveler Information Systems	Existing
		Multimodal Transit Centers	Planned
		Multimodal Transit Centers Kiosks	Planned
		Regional Airport Information Systems	Existing
		Rural Transit Systems	Existing
		Rural Transit Systems Transit Vehicles	Planned
		Urban Transit Systems	Existing
		Urban Transit Systems Kiosks	Existing
		Urban Transit Systems Transit Vehicles	Planned
		User Personal Computing Devices	Existing
ATIS1	Broadcast Traveler Information	County and City Smart Parking Systems	Planned
		County and City Smart Parking Systems Kiosks	Planned
		County and City Smart Parking Systems Transit Information Signs	Planned
		Intercity Transit Traveler Information Systems	Existing
		Intercity Transit Traveler Information Systems Kiosks	Existing
		MDOT Commercial Vehicle Traveler Information Network	Planned
		MDOT Statewide TMC	Existing
		MDOT Statewide TMC Kiosks	Existing
		MDOT MSTraffic.com	Existing
		MDOT Truck Stop Kiosks	Planned
		Media	Existing
		Mississippi Road/Weather Conditions Website	Existing
		Regional Airport Information Systems	Existing
		User Personal Computing Devices	Existing
ATIS2	Interactive Traveler Information	MDOT Statewide 511 System	Planned
		MDOT Traveler Information Repository	Planned
		Telecommunications Systems for Traveler Information	Planned
ATMS01	Network Surveillance	County and City TMCs	Existing
		County and City TMCs Roadside Equipment	Existing
		MDOT CCTV	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT Statewide TMC	Existing
		MDOT MSTraffic.com	Existing
		MDOT Portable Traffic Management Centers	Planned
		MDOT Portable Traffic Management Centers Roadside Equipment	Planned

Market Package	Market Package Name	Associated Element	Status
		MDOT Traffic Sensors	Existing
ATMS03	Surface Street Control	County and City TMCs	Existing
		County and City TMCs Roadside Equipment	Existing
		MDOT CCTV	Existing
		MDOT Closed Loop Signal System	Existing
		MDOT Statewide TMC	Existing
		MDOT Traffic Sensors	Existing
ATMS04	Freeway Control	MDOT CCTV	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT Dynamic Message Signs	Planned
		MDOT Dynamic Speed Zone Signs	Planned
		MDOT Highway Advisory Radio	Planned
		MDOT Statewide TMC	Existing
		MDOT Portable Dynamic Message Signs	Planned
		MDOT Portable Traffic Management Centers	Planned
		MDOT Portable Traffic Management Centers Roadside Equipment	Planned
		MDOT Reversible Lane Management	Planned
		MDOT Speed Warning System	Planned
		MDOT Traffic Sensors	Existing
ATMS06	Traffic Information Dissemination	County and City TMCs	Planned
		County and City TMCs Roadside Equipment	Planned
		MDOT District Traffic Operations Centers	Planned
		MDOT Dynamic Message Signs	Planned
		MDOT Highway Advisory Radio	Planned
		MDOT Statewide TMC	Planned
		MDOT MSTraffic.com	Planned
		MDOT Portable Dynamic Message Signs	Planned
		MDOT Portable Traffic Management Centers	Planned
		MDOT Portable Traffic Management Centers Roadside Equipment	Planned
		MDOT Variable Trailblazer Signs	Planned
ATMS07	Regional Traffic Control	County and City TMCs	Existing/ Planned
		MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Existing
		MDOT Portable Traffic Management Centers	Planned
		Neighboring State County and City Traffic Control Centers	Planned
		Neighboring State DOT Traffic Offices	Planned
ATMS08	Traffic Incident Management System	County and City 911 Dispatch Centers	Existing
		County and City Emergency Vehicles	Existing
		County and City Maintenance and Construction Offices	Existing
		County and City TMCs	Existing/ Planned
		County and City TMCs Roadside Equipment	Existing/ Planned
		County Emergency Operations Centers	Existing
		Event Promoters and Traffic Generators	Existing
		Intercity Transit Systems	Existing
		Intermodal Rail Freight Facility	Existing
		MDOT CCTV	Existing
		MDOT Commercial Vehicle Traveler Information Network	Planned

Market Package	Market Package Name	Associated Element	Status
		MDOT District Traffic Operations Centers	Existing
		MDOT Statewide TMC	Existing
		MDOT Maintenance and Construction Offices	Existing
		MDOT MSTraffic.com	Existing
		MDOT Portable Traffic Management Centers	Planned
		MDOT Portable Traffic Management Centers Roadside Equipment	Planned
		MDOT Statewide 511 System	Planned
		MDOT Traffic Sensors	Existing
		Media	Existing
		MHP Dispatch Centers	Existing
		MHP Emergency Vehicles	Existing
		Mississippi Department of Environmental Quality	Existing
		Mississippi Road/Weather Conditions Website	Existing
		Multimodal Transit Centers	Planned
		National Park Service Center Natchez Trace Parkway	Existing
		Neighboring State County and City Traffic Control Centers	Existing
		Neighboring State DOT Traffic Offices	Existing
		Neighboring State Highway Patrol Dispatch Centers	Existing
		Rail Companies	Existing
		Rural Transit Systems	Existing
		Urban Transit Systems	Existing
ATMS10	Electronic Toll Collection	MDOT District 5	Planned
		CMPDD	Planned
		Airport Parkway Toll Administration	Planned
		Airport Parkway Toll Operations	Planned
ATMS13	Standard Railroad Grade Crossing	County and City TMCs	Existing
		County and City TMCs Roadside Equipment	Existing
		MDOT Closed Loop Signal System	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT Statewide TMC	Existing
		Rail Companies	Existing
		Railroad Wayside Equipment	Existing
ATMS14	Advanced Railroad Grade Crossing	County and City TMCs	Planned
		County and City TMCs Roadside Equipment	Planned
		MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Planned
		MDOT Railroad Crossing Control	Planned
		Rail Companies	Planned
		Railroad Wayside Equipment	Planned
ATMS16	Parking Facility Management	County and City Smart Parking Systems	Planned
		Driver	Planned
		Traveler Card	Planned
ATMS18	Reversible Lane Management	MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Planned
		MDOT Reversible Lane Management	Planned
ATMS19	Speed Monitoring	Driver	Planned
		MDOT Automated Truck Rollover Warning Systems	Planned
		MDOT Dynamic Speed Zone Signs	Planned
		MDOT Speed Warning System	Planned
		MHP Central and District Offices	Planned

Market Package	Market Package Name	Associated Element	Status
ATMS21	Roadway Closure Management	County and City 911 Dispatch Centers	Planned
		County Emergency Operations Centers	Planned
		MDOT Automated Gate Closure System	Planned
		MDOT CCTV	Planned
		MDOT Statewide TMC	Planned
		MDOT Portable Dynamic Message Signs	Planned
		MEMA Emergency Operations Center	Planned
		MHP Dispatch Centers	Planned
CVO03	Electronic Clearance	MDOT CVISN Credentialing Infrastructure System	Existing
		MDOT PrePass System	Existing
		Private Trucking Companies	Existing
		Private Trucking Companies Commercial Vehicles	Existing
CVO04	CV Administrative Processes	FMCSA CVISN System	Existing
		IFTA Clearinghouse	Existing
		IRP Clearinghouse	Existing
		MDOT CVISN Credentialing Infrastructure System	Existing
		MDOT ExpressPass Permitting System	Existing
		Mississippi Public Service Commission SAFETYNET	Existing
		Mississippi State Tax Commission CV Databases	Existing
		Private Trucking Companies	Existing
CVO06	Weigh-In-Motion	MDOT Automatic Truck Rollover Warning Systems	Planned
		MDOT Weigh-in-Motion Stations	Existing
		Port Authority Facilities	Existing
		Private Trucking Companies Commercial Vehicles	Existing
CVO07	Roadside CVO Safety	MDOT CVISN Credentialing Infrastructure System	Existing
		MDOT PrePass System	Existing
		MDOT Weigh-in-Motion Stations	Existing
		Private Trucking Companies	Existing
		Private Trucking Companies Commercial Vehicles	Existing
CVO11	Roadside HAZMAT Security Detection and Mitigation	MDOT CVISN Credentialing Infrastructure System	Planned
		MDOT PrePass System	Planned
		MDOT Weigh-in-Motion Stations	Planned
		Mississippi Department of Environmental Quality	Planned
		Private Trucking Companies Commercial Vehicles	Planned
EM01	Emergency Call-Taking and Dispatch	County and City 911 Dispatch Centers	Existing
		County and City Emergency Vehicles	Existing
		County Emergency Operations Centers	Existing
		Emergency Telecommunications System	Existing
		MHP *HP Cellular Phone System	Existing
		MHP Central and District Offices	Existing
		MHP Dispatch Centers	Existing
		MHP Emergency Vehicles	Existing
		Mississippi Department of Environmental Quality	Existing
		Multimodal Transit Centers	Planned
		Neighboring State Highway Patrol Dispatch Centers	Existing
		Rural Transit Systems	Existing
		Urban Transit Systems	Existing
EM02	Emergency Routing	County and City 911 Dispatch Centers	Existing
		County and City Emergency Vehicles	Existing
		County and City TMCs Roadside Equipment	Existing
		MDOT Closed Loop Signal System	Existing
		MHP Emergency Vehicles	Planned

Market Package	Market Package Name	Associated Element	Status
EM04	Roadway Service Patrols	MDOT District Traffic Operations Centers	Planned
		MDOT Highway Service Patrol Vehicles	Planned
		MDOT Statewide TMC	Planned
EM06	Wide-Area Alert	County and City 911 Dispatch Centers	Existing
		County and City Public Safety Agencies	Existing
		County and City TMCs	Existing
		County Emergency Operations Centers	Existing
		MDOT Commercial Vehicle Traveler Information Network	Planned
		MDOT District Traffic Operations Centers	Existing
		MDOT Dynamic Message Signs	Planned
		MDOT Highway Advisory Radio	Planned
		MDOT MSTraffic.com	Existing
		MDOT Portable Dynamic Message Signs	Planned
		MDOT Portable Traffic Management Centers	Planned
		MDOT Portable Traffic Management Centers Roadside Equipment	Planned
		MDOT Statewide 511 System	Planned
		MDOT Traveler Information Repository	Planned
		MDOT Truck Stop Kiosks	Planned
		MEMA Emergency Operations Center	Existing
		MHP Central and District Offices	Existing
		MHP Dispatch Centers	Existing
		Mississippi Department of Public Safety	Existing
		Mississippi Bureau of Investigation	Existing
		Mississippi Emergency Management Agency	Existing
		Mississippi Office of Homeland Security	Existing
		Mississippi Road/Weather Conditions Website	Existing
		Multimodal Transit Centers	Planned
		Multimodal Transit Centers Kiosks	Planned
		Neighboring State Emergency Management Centers	Existing
		Regional Airport Information Systems	Existing
		Rural Transit Systems	Existing
		Telecommunications Systems for Traveler Information	Existing
		Urban Transit Systems	Existing
		User Personal Computing Devices	Existing
		Weather Service	Existing
EM07	Early Warning System	County Emergency Operations Centers	Existing
		MEMA Emergency Operations Center	Existing
		Mississippi Emergency Management Agency	Existing
		Mississippi Department of Public Safety	Existing
		Mississippi Office of Homeland Security	Existing
		Neighboring State Emergency Management Centers	Existing
		Weather Service	Existing
EM08	Disaster Response and Recovery	Mississippi Department of Public Safety	Existing
		County and City 911 Dispatch Centers	Existing
		County and City Maintenance and Construction Offices	Existing
		County and City TMCs	Existing
		County Emergency Operations Centers	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT Statewide TMC	Existing
		MDOT Maintenance and Construction Offices	Existing
		MDOT Portable Traffic Management Centers	Planned

Market Package	Market Package Name	Associated Element	Status
		MEMA Emergency Operations Center	Existing
		MHP Central and District Offices	Existing
		MHP Dispatch Centers	Existing
		Mississippi Department of Environmental Quality	Existing
		Mississippi Emergency Management Agency	Existing
		Mississippi Office of Homeland Security	Existing
		Neighboring State Emergency Management Centers	Existing
		Rural Transit Systems	Existing
		Urban Transit Systems	Existing
EM09	Evacuation and Reentry Management	Mississippi Department of Public Safety	Existing
		County and City 911 Dispatch Centers	Existing
		County and City Maintenance and Construction Offices	Existing
		County and City TMCs	Existing
		County Emergency Operations Centers	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT Statewide TMC	Existing
		MDOT Maintenance and Construction Offices	Existing
		MDOT Portable Traffic Management Centers	Planned
		MEMA Emergency Operations Center	Existing
		MHP Dispatch Centers	Existing
		Mississippi Emergency Management Agency	Existing
		Mississippi Office of Homeland Security	Existing
		Multimodal Transit Centers	Planned
		Neighboring State Emergency Management Centers	Existing
		Neighboring State Highway Patrol Dispatch Centers	Existing
		Rural Transit Systems	Existing
		Urban Transit Systems	Existing
EM10	Disaster Traveler Information	County Emergency Operations Centers	Existing
		MDOT MSTraffic.com	Existing
		MDOT Statewide 511 System	Planned
		MDOT Traveler Information Repository	Planned
		Media	Existing
		MEMA Emergency Operations Center	Existing
		Mississippi Emergency Management Agency	Existing
		Mississippi Department of Public Safety	Existing
		Mississippi Office of Homeland Security	Existing
		Multimodal Transit Centers	Planned
		Multimodal Transit Centers Kiosks	Planned
		Regional Airport Information Systems	Existing
		Telecommunications Systems for Traveler Information	Existing
		User Personal Computing Devices	Existing
MC01	Maintenance and Construction Vehicle and Equipment Tracking	MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Planned
		MDOT Maintenance and Construction Offices	Planned
		MDOT Maintenance Vehicles	Planned
MC02	Maintenance and Construction Vehicle Maintenance	County and City Maintenance and Construction Offices	Existing
		MDOT Maintenance and Construction Offices	Existing
		MDOT Maintenance Vehicles	Planned

Market Package	Market Package Name	Associated Element	Status
MC03	Road Weather Data Collection	MDOT Fog Detection Systems	Planned
		MDOT Maintenance and Construction Offices	Planned
		MDOT Weather Sensors	Planned
		Weather Service	Planned
MC04	Weather Information Processing and Distribution	MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Planned
		MDOT Maintenance and Construction Offices	Planned
		MDOT MSTraffic.com	Planned
		MHP Dispatch Centers	Planned
		Mississippi Road/Weather Conditions Website	Planned
		Weather Service	Existing
MC06	Winter Maintenance	MDOT Maintenance and Construction Offices	Planned
		MDOT Maintenance Vehicles	Planned
		Weather Service	Planned
MC07	Roadway Maintenance and Construction	County and City Maintenance and Construction Offices	Planned
		County and City TMCs	Planned
		MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Planned
		MDOT Maintenance and Construction Offices	Planned
		MDOT Maintenance Vehicles	Planned
MC08	Work Zone Management	County and City Maintenance and Construction Field Devices	Planned
		County and City Maintenance and Construction Offices	Planned
		MDOT Automated Gate Closure System	Planned
		MDOT District Traffic Operations Centers	Planned
		MDOT Statewide TMC	Planned
		MDOT Maintenance and Construction Field Devices	Planned
		MDOT Maintenance and Construction Offices	Planned
		MDOT Portable Traffic Management Centers	Planned
		MDOT Portable Traffic Management Centers Roadside Equipment	Planned
		Media	Planned
MC09	Work Zone Safety Monitoring	County and City Maintenance and Construction Field Devices	Planned
		County and City Maintenance and Construction Offices	Planned
MC10	Maintenance and Construction Activity Coordination	County and City 911 Dispatch Centers	Existing
		County and City Maintenance and Construction Offices	Existing
		County and City TMCs	Existing
		Intercity Transit Systems	Existing
		MDOT District Traffic Operations Centers	Existing
		MDOT Statewide TMC	Existing
		MDOT Maintenance and Construction Offices	Existing
		Media	Existing
		MHP Dispatch Centers	Existing
		Multimodal Transit Centers	Existing
		Rail Companies	Existing
		Rural Transit Systems	Existing
		Urban Transit Systems	Existing

6. SUBSYSTEMS, EQUIPMENT PACKAGES AND FUNCTIONAL REQUIREMENTS

As one of the required components of an ITS Architecture identified in FHWA Final Rule and FTA Policy on ITS Architecture and Standards, this section of the report summarizes the system functional requirements for the Mississippi Statewide ITS Architecture in terms of market packages, subsystems, and equipment packages.

6.1 Mapping of Market Packages to Subsystems and Equipment Packages

A market package is implemented with a combination of interrelated equipment; this equipment often resides in several different subsystems within the architecture framework and may be operated by different stakeholders. For instance, the Transit Vehicle Tracking market package includes vehicle location equipment in the Transit Vehicle Subsystem and a base station element in the Transit Management Subsystem. In this example, all market package elements are owned and operated by the same transit stakeholder.

In other cases, the market package elements are owned and operated by different stakeholders. Many of the Advanced Traveler Information Systems (ATIS) market packages require equipment in the Information Service Provider Subsystem that is owned and operated by a public or private information provider and equipment that is acquired and operated by the consumer as part of the Vehicle Subsystem or Personal Information Access Subsystem. Since equipment in different subsystems may be purchased and operated by different end-users, these subsystem-specific components may encounter varied deployment.

To understand and analyze these potential deployment variations, the defined market packages must be decomposed to their constituent elements. The portion of the market package capabilities that are allocated to each subsystem are segregated and defined as equipment packages to support this additional resolution. An equipment package represents a set of equipment/capabilities that are likely to be purchased by an end-user as a component to an overall system. It should be noted that there are no equipment packages defined for the terminators of the National ITS Architecture, as they represent systems on the boundary of the architecture and do not have functional descriptions within the architecture.

Table 6-1 illustrates the subsystems and equipment packages that mapped to the customized list of market packages. The table illustrates the specific market packages in the Mississippi Statewide ITS Architecture, the subsystems that are part of the market packages, and the equipment packages that make up the market packages. As indicated in the table, the architecture provides a means to map the market package to appropriate subsystems (components) and equipment packages (technology). The equipment packages identified in Table 6-1 were used to develop the specific functional requirements of each element. The definitions of the equipment packages can be found via the National ITS Architecture website at http://itsarch.iteris.com/itsarch/.

Table 6-1. Market Packages, Subsystems and Equipment Packages

Market Package	Market Package Name	Subsystem	Equipment Package
AD1	ITS Data Mart	Archived Data Management Subsystem	Government Reporting Systems Support
			ITS Data Repository
			Traffic and Roadside Data Archival
		Emergency Management	Emergency Data Collection
		Maintenance and Construction Management	MCM Data Collection
		Roadway Subsystem	Roadway Data Collection
		Traffic Management	Traffic Data Collection
		Parking Management	Parking Data Collection
		Transit Management	Transit Data Collection
AD2	ITS Data Warehouse	Archived Data Management Subsystem	Government Reporting Systems Support
			ITS Data Repository
			Traffic and Roadside Data Archival
		Commercial Vehicle Administration	CV Data Collection
		Emergency Management	Emergency Data Collection
		Maintenance and Construction Management	MCM Data Collection
		Roadway Subsystem	Roadway Data Collection
		Traffic Management	Traffic Data Collection
APTS1	Transit Vehicle Tracking	Transit Management	Transit Center Tracking and Dispatch
		Transit Vehicle Subsystem	On-board Transit Trip Monitoring
		Vehicle	Vehicle Location Determination
APTS2	Transit Fixed-Route Operations	Transit Management	Transit Center Fixed-Route Operations
			Transit Vehicle Operator Scheduling
		Transit Vehicle Subsystem	On-board Fixed Route Schedule Management
APTS3	Demand Response Transit Operations	Transit Management	Transit Center Paratransit Operations
			Transit Vehicle Operator Scheduling
		Transit Vehicle Subsystem	On-board Paratransit Operations
APTS4	Transit Passenger and Fare Management	Transit Management	Transit Center Fare and Load Management
		Transit Vehicle Subsystem	On-board Transit Fare and Load Management
		Remote Traveler Support	Remote Transit Fare Management
APTS5	Transit Security	Transit Management	Transit Center Security
		Transit Vehicle Subsystem	On-board Transit Security
		Emergency Management	Center Secure Area Surveillance
APTS6	Transit Maintenance	Transit Management	Transit Garage Maintenance
		Transit Vehicle Subsystem	On-board Maintenance

Market Package	Market Package Name	Subsystem	Equipment Package
ATPS7	Multi-modal Coordination	Transit Management	Transit Center Multi-Modal Coordination
		Transit Vehicle Subsystem	On-board Transit Signal Priority
		Traffic Management	TMC Signal Control
			TMC Multimodal Coordination
		Roadway Subsystem	Roadway Signal Priority
APTS8	Transit Traveler Information	Transit Management	Transit Center Information Services
		Transit Vehicle Subsystem	On-board Transit Information Services
		Remote Traveler Support	Remote Transit Information Services
		Information Service Provider	ISP Traveler Data Collection
			Infrastructure Provided Trip Planning
		Personal Information Access	Personal Interactive Information Reception
ATIS1	Broadcast Traveler Information	Information Service Provider	Basic Information Broadcast
			ISP Traveler Data Collection
		Personal Information Access	Personal Basic Information Reception
		Remote Traveler Support	Remote Basic Information Reception
ATIS2	Interactive Traveler Information	Information Service Provider	Traveler Telephone Information
			ISP Traveler Data Collection
ATMS01	Network Surveillance	Traffic Management	Collect Traffic Surveillance
			Traffic Maintenance
		Roadway Subsystem	Roadway Basic Surveillance
ATMS03	Surface Street Control	Traffic Management	Collect Traffic Surveillance
			TMC Signal Control
			Traffic Maintenance
		Roadway Subsystem	Roadway Signal Controls
			Roadway Basic Surveillance
			Roadway Equipment Coordination
ATMS04	Freeway Control	Traffic Management	TMC Traffic Information Dissemination
			Collect Traffic Surveillance
			TMC Freeway Management
			Traffic Maintenance
		Roadway Subsystem	Roadway Traffic Information Dissemination
			Roadway Basic Surveillance
			Roadway Equipment Coordination
			Roadway Freeway Control
ATMS06	Traffic Information Dissemination	Traffic Management	TMC Traffic Information Dissemination
		Roadway Subsystem	Roadway Traffic Information Dissemination

Market Package	Market Package Name	Subsystem	Equipment Package
ATMS07	Regional Traffic Control	Traffic Management	TMC Regional Traffic Control
			TMC Signal Control
			TMC Freeway Management
ATMS08	Traffic Incident Management System	Traffic Management	TMC Incident Detection
			TMC Incident Dispatch Coordination/Communication
		Roadway Subsystem	Roadway Incident Detection
		Emergency Management	Emergency Response Management
			Incident Command
		Maintenance and Construction Management	MCM Incident Management
		Emergency Vehicle	On-board EV Incident Management Communication
ATMS10	Electronic Toll Collection	Toll Administration	Toll Administration
		Toll Collection	Toll Plaza Toll Collection
ATMS13	Standard Railroad Grade Crossing	Traffic Management	HRI Traffic Management
		Roadway Subsystem	Standard Rail Crossing
ATMS14	Advanced Railroad Grade Crossing	Traffic Management	HRI Traffic Management
		Roadway Subsystem	Advanced Rail Crossing
ATMS16	Parking Facility Management	Parking Management	Parking Electronic Payment
			Parking Management
ATMS18	Reversible Lane Management	Traffic Management	TMC Reversible Lane Management
		Roadway Subsystem	Roadway Reversible Lanes
			Roadway Equipment Coordination
ATMS19	Speed Monitoring	Traffic Management	TMC Speed Monitoring
		Roadway Subsystem	Roadway Speed Monitoring
			Roadway Equipment Coordination
ATMS21	Roadway Closure Management	Traffic Management	Barrier System Management
			Collect Traffic Surveillance
			TMC Traffic Information Dissemination
		Roadway Subsystem	Field Barrier System Control
			Roadway Basic Surveillance
			Roadway Equipment Coordination
			Roadway Work Zone Traffic Control
			Roadway Traffic Information Dissemination
		Maintenance and Construction Management	MCM Work Zone Management
		Emergency Management	Emergency Response Management
CVO03	Electronic Clearance	Commercial Vehicle Administration	CV Information Exchange
			CV Safety Administration
		Commercial Vehicle Check	Citation and Accident Electronic Recording
			Roadside Electronic Screening

Market Package	Market Package Name	Subsystem	Equipment Package
		Commercial Vehicle Subsystem	On-board CV Electronic Data
CVO04	CV Administrative Processes	Commercial Vehicle Administration	Credentials and Taxes Administration
			CV Information Exchange
		Fleet and Freight Management	Fleet Administration
			Fleet Credentials and Taxes Management and Reporting
CVO06	Weigh-In-Motion	Commercial Vehicle Check	Roadside WIM
		Commercial Vehicle Subsystem	On-board CV Electronic Data
CVO07	Roadside CVO Safety	Commercial Vehicle Administration	CV Information Exchange
			CV Safety Administration
		Commercial Vehicle Check	Roadside Safety and Security Inspection
			Citation and Accident Electronic Recording
			Roadside Electronic Screening
		Fleet and Freight Management	Fleet Administration
		Commercial Vehicle Subsystem	On-board CV Electronic Data
CVO11	Roadside HAZMAT Security Detection and Mitigation	Emergency Management	Emergency Commercial Vehicle Response
		Commercial Vehicle Check	Roadside HAZMAT detection
EM01	Emergency Call-Taking and Dispatch	Emergency Management	Emergency Call-Taking
			Emergency Dispatch
		Emergency Vehicle Subsystem	On-board EV En Route Support
EM02	Emergency Routing	Emergency Vehicle Subsystem	On-board EV En Route Support
		Roadway Subsystem	Roadway Signal Priority
EM04	Roadway Service Patrols	Emergency Management	Service Patrol Management
		Emergency Vehicle Subsystem	On-board EV En Route Support
			On-board EV Incident Management Communication
EM06	Wide-Area Alert	Emergency Management	Emergency Early Warning System
		Information Service Provider	ISP Emergency Traveler Information
			ISP Traveler Data Collection
			Traveler Telephone Information
		Traffic Management	TMC Traffic Information Dissemination
		Personal Information Access	Personal Basic Information Reception

Market Package	Market Package Name	Subsystem	Equipment Package
		Roadway Subsystem	Roadway Traffic Information Dissemination
		Remote Traveler Support	Remote Basic Information Reception
EM07	Early Warning System	Emergency Management	Emergency Early Warning System
			Emergency Environmental Monitoring
EM08	Disaster Response and Recovery	Emergency Management	Emergency Response Management
			Incident Command
		Maintenance and Construction Management	MCM Incident Management
			MCM Roadway Maintenance and Construction
		Traffic Management	TMC Incident Dispatch Coordination/Communication
		Transit Management	Transit Center Security
EM09	Evacuation and Reentry Management	Emergency Management	Emergency Evacuation Support
		Traffic Management	TMC Evacuation Support
		Transit Management	Transit Evacuation Support
		Maintenance and Construction Management	MCM Incident Management
EM10	Disaster Traveler Information	Emergency Management	Emergency Evacuation Support
			Emergency Response Management
		Information Service Provider	ISP Emergency Traveler Information
			ISP Traveler Data Collection
		Personal Information Access	Personal Basic Information Reception
		Remote Traveler Support	Remote Interactive Information Reception
			Remote Basic Information Reception
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Maintenance and Construction Management	MCM Vehicle Tracking
		Maintenance and Construction Vehicle	MCV Vehicle Location Tracking
		Vehicle	Vehicle Location Determination
MC02	Maintenance and Construction Vehicle Maintenance	Maintenance and Construction Management	MCM Vehicle and Equipment Maintenance Management
		Maintenance and Construction Vehicle	MCV Vehicle System Monitoring and Diagnostics
MC03	Road Weather Data Collection	Maintenance and Construction Management	MCM Environmental Information Collection
		Roadway Subsystem	Roadway Environmental Monitoring
MC04	Weather Information Processing and Distribution	Maintenance and Construction Management	MCM Environmental Information Processing
		Traffic Management	TMC Environmental Monitoring
		Emergency Management	Emergency Environmental Monitoring
		Information Service Provider	ISP Traveler Data Collection

Market Package	Market Package Name	Subsystem	Equipment Package
MC06	Winter Maintenance	Maintenance and Construction Management	MCM Maintenance Decision Support
			MCM Winter Maintenance Management
		Maintenance and Construction Vehicle	MCV Winter Maintenance
		Traffic Management	TMC Incident Dispatch Coordination/Communication
MC07	Roadway Maintenance and Construction	Maintenance and Construction Management	MCM Maintenance Decision Support
			MCM Roadway Maintenance and Construction
		Maintenance and Construction Vehicle	MCV Roadway Maintenance and Construction
		Traffic Management	Traffic Maintenance
MC08	Work Zone Management	Maintenance and Construction Management	MCM Work Zone Management
		Traffic Management	TMC Work Zone Traffic Management
		Roadway Subsystem	Roadway Work Zone Traffic Control
MC09	Work Zone Safety Monitoring	Maintenance and Construction Management	MCM Work Zone Safety Management
		Roadway Subsystem	Roadway Work Zone Safety
			Roadway Equipment Coordination
MC10	Maintenance and Construction Activity Coordination	Maintenance and Construction Management	MCM Work Activity Coordination
		Emergency Management	Emergency Response Management
		Transit Management	Transit Center Multi-Modal Coordination
		Traffic Management	TMC Work Zone Traffic Management

6.2 Functional Requirements

A functional requirement is a task or activity that is currently performed or is planned to be performed by each system in the region to provide the required regional ITS services. In the National ITS Architecture, each functional area (i.e. equipment package) has defined several specific functional requirements that are required for performing the equipment package capabilities. These specific functional requirements of the National ITS Architecture are commonly used as a baseline to develop the functional requirements of a regional ITS Architecture.

The process to develop the functional requirements of the Mississippi Statewide ITS Architecture begins with the mapping of functional areas to market packages and associated elements as an initial definition of the functions being performed by each element. The

functional requirements of each equipment package were then tailored to provide a more accurate picture of the functions performed. Using Turbo Architecture, functional requirements that support the ITS projects for the Statewide region were identified. These functional requirements are listed in Appendix B. The Appendix includes the following information for each ITS element:

- **Element.** Name of the system that will be performing the function
- **Entity.** Describes the National ITS Architecture subsystem to which the element is mapped
- **Functional Area.** Description of the function performed by the element
- **Requirement.** High-level functional requirement to be performed by the element supporting the functional area

Example:

To illustrate functions and functional requirements, the ITS element MDOT Statewide TMC is used as an example. The MDOT Statewide TMC is MDOT's ITS/traffic management system. The center is located in Jackson. In the Statewide ITS Architecture, the MDOT Statewide TMC was mapped to the Traffic Management, Maintenance and Construction Management, Emergency Management, and Information Service Provider subsystems. A market package associated with the MDOT Statewide TMC is Network Surveillance. Two functional areas (equipment packages) are required for the MDOT Statewide TMC to perform the network surveillance capability. They are:

- **Collect Traffic Surveillance**: This equipment package remotely monitors and controls traffic sensors and surveillance (e.g., CCTV) equipment, and collects, processes and stores the collected traffic data. The collected information is provided to traffic operations personnel and made available to other centers.
- **Traffic Maintenance**: This equipment package monitors the operational status of field equipment and detects failures. It presents field equipment status to Traffic Operations Personnel and reports failures to the Maintenance and Construction Management Subsystem. The equipment package tracks the repair or replacement of the failed equipment. The entire range of ITS field equipment may be monitored by this equipment package including sensors (traffic, infrastructure, environmental, security, speed, etc.) and devices (highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, beacons, security surveillance equipment, etc.).

In the National ITS Architecture, the Collect Traffic Surveillance equipment package contains 7 specific functional requirements and the Traffic Maintenance equipment package has 8. However, not all of the functional requirements are applicable to the MDOT Statewide TMC. The appropriate functional requirements for each equipment package were tailored and identified in the Table 6-2.

Table 6-2. Example: Functional Requirements for MDOT Statewide TMC Network Surveillance

Functional Area	Functional Requirements	Status
Collection Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data collected from field elements under remote control of the center.	Existing
	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Existing
	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Existing
	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	Existing
	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.	Existing
	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	Existing

Functional Area	Functional Requirements	Status
Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	Existing
	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Existing
	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	Existing
	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Existing

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7. INTERCONNECTS AND ARCHITECTURE FLOWS

While it is important to identify the various systems and stakeholders as part of the Mississippi Statewide ITS Architecture, a primary purpose of the Mississippi Statewide ITS Architecture is to identify the *connectivity* between systems.

- **Architecture Interconnects** define an ITS Architecture from a physical perspective, which shows the connections that can be established between equipment and systems which may be deployed by different organizational or operating agencies throughout the region.
- **Architecture Flows** define an ITS Architecture from a logical perspective, which identify a high level information exchange associated with each interconnect between equipment and systems.

7.1 System Interconnects

Based on subsystems and market packages that are selected for each ITS inventory element, a set of interconnects between the elements have been identified. As shown in Figure 7-1, a high-level interconnect diagram for the Mississippi Statewide ITS Architecture, often referred to as a "sausage diagram," illustrates the subsystems and primary types of interconnections (or communications) between these subsystems. The sausage diagram was customized to reflect the systems of the Mississippi Statewide ITS Architecture. The shaded areas in Figure 7-1 indicate the functions and services that are not currently existing and planned in the state. The sausage diagram identifies three basic types of communications used to interconnect the elements within Mississippi. The definitions of the three types of communications are:

- **Fixed-Point to Fixed Point Communications:** a communication link serving stationary entities. It may be implemented using a variety of public or private communication networks and technologies. It can include, but is not limited to, twisted pair, coaxial cable, fiber optic, microwave relay networks, spread spectrum, etc. In fixed-point to fixed-point communication the important issue is that it serves stationary entities. Both dedicated and shared communication resources may be used.
- **Wide-Area Wireless Communications:** a communications link that provides communications via a wireless device between a user and an infrastructure-based system. Both broadcast (one-way) and interactive (two-way) communications services are grouped into wide-area wireless communications in the National ITS Architecture. These links support a range of services in the National ITS Architecture including real-time traveler information and various forms of fleet communications.
- **Dedicated Short Range Communications:** a wireless communications channel used for close-proximity communications between vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations.

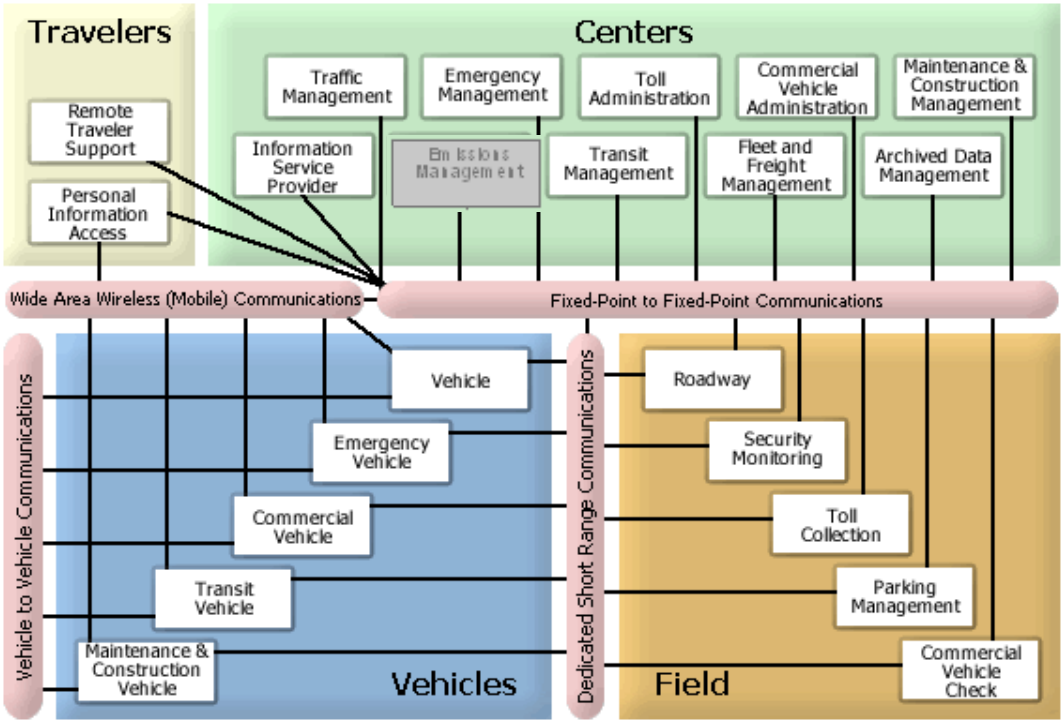

Figure 7-1. Mississippi Statewide ITS Architecture Sausage Diagram

On a more specific level, interconnect diagrams can depict the interactions between a specific element and other associated agencies and their systems within the architecture. Figure 7-2 illustrates interconnects between the MDOT Statewide TMC and other existing or planned elements. A complete set of the interconnect diagrams for the Mississippi Statewide ITS Architecture is included in Appendix C and can also be found in the Turbo Architecture database.

7.2 Architecture Flows

Architecture flows provide a high level description of information exchange associated with each interconnect between equipment and systems. The architecture flows identified in the Mississippi Statewide ITS Architecture were derived from the architecture flow diagrams within the National ITS Architecture, and therefore, they are consistent with the National ITS Architecture. Through the architecture flows, stakeholders can easily identify the existing or potential information exchange between agencies and systems. This provides a framework for analyzing how elements are related and thus identifies the areas for potential coordination and cooperation among agencies. Figure 7-3 illustrates the architecture flow diagram for the County and City TMCs. Detailed definitions of architecture flows can be found at the National ITS Architecture website at http://www.iteris.com/itsarch/. A complete list of architecture flows for the Mississippi Statewide ITS Architecture is provided in Appendix D, and can be found in the Turbo Architecture database.

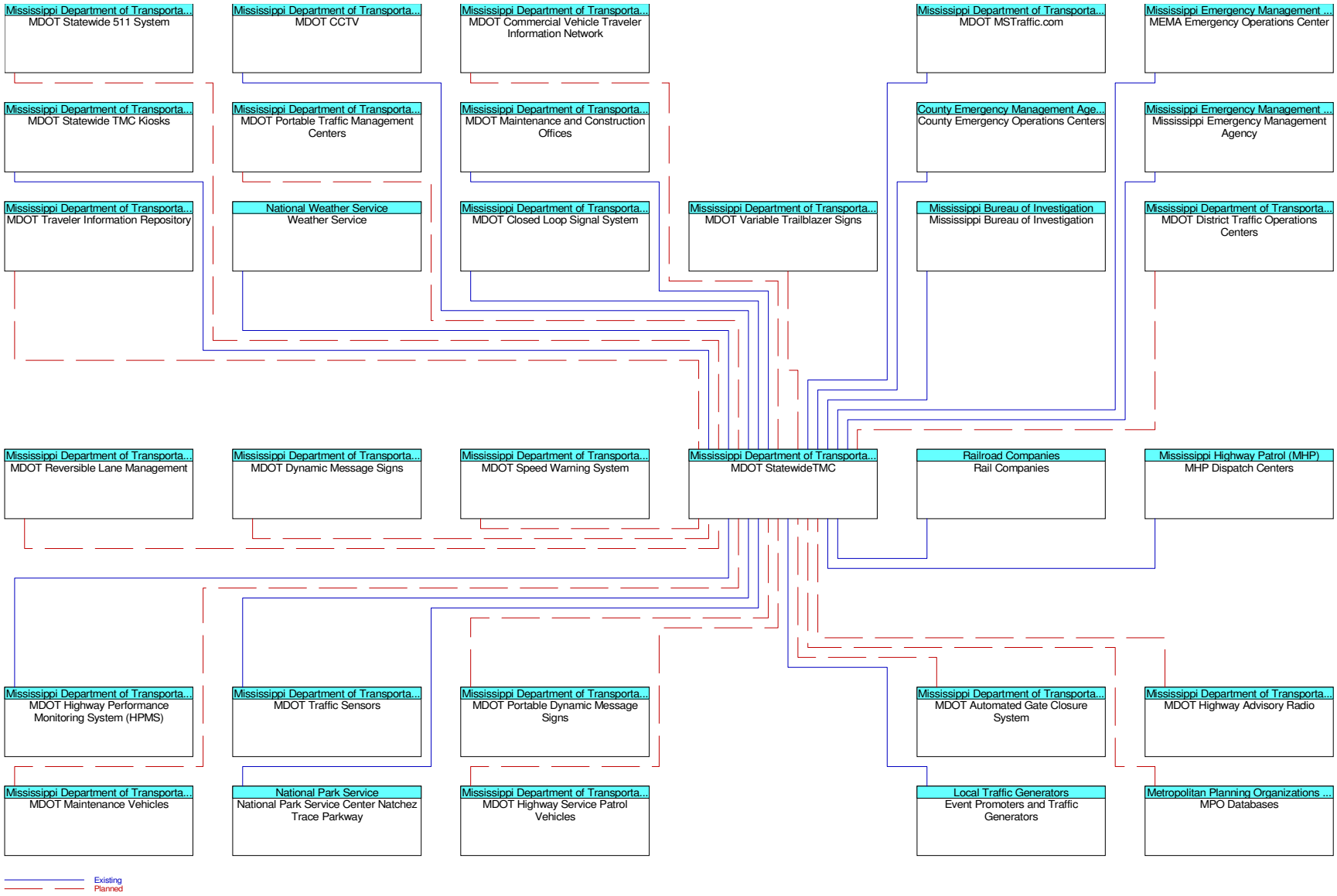

Figure 7-2. Sample: Interconnect Diagram for MDOT Statewide TMC

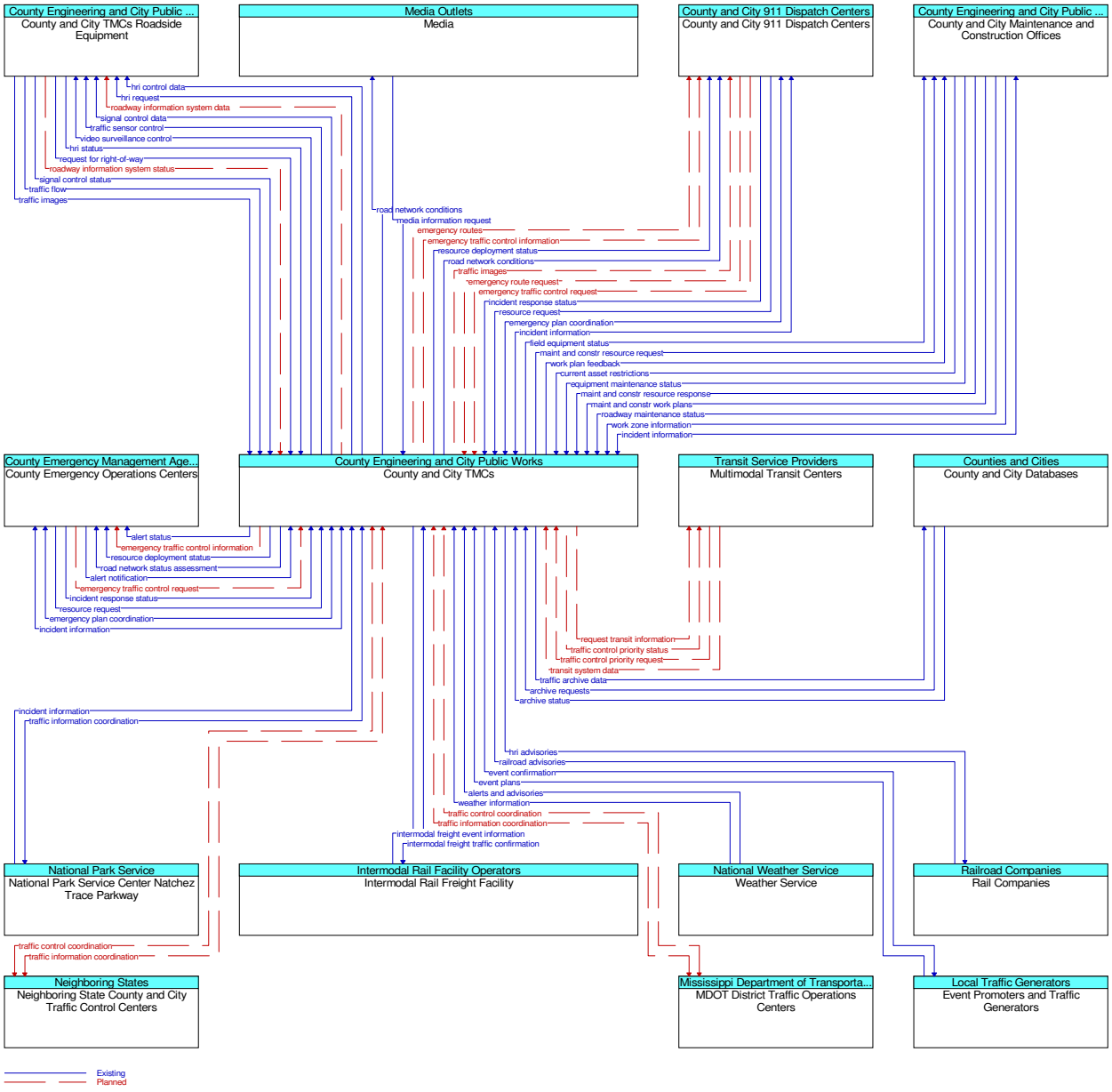

Figure 7-3. Sample: Architecture Flow Diagram for County and City TMCs

8. ITS STANDARDS

ITS Standards are fundamental to the establishment of an open ITS environment that achieves the goals originally envisioned by the U.S. Department of Transportation. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve.

Standards can be thought of as the glue that holds the various pieces of architecture together. The logical architecture presents a functional view of the ITS user services. It defines the functions or processes that are required to perform the selected ITS user services, and the information or data flows that need to be exchanged between these functions. The physical architecture partitions the functions defined by the logical architecture into systems and subsystems. To accomplish the functions outlined in the logical architecture, communication must take place between the elements of the physical architecture. Standards define how these communications take place.

8.1 Standards Benefits

Many of the benefits the public receives from the National ITS Architecture are a direct result of the development and implementation of standards. Primarily, standards provide benefits in the following areas:

- **National Compatibility** – National compatibility is represented by the ability to use the same equipment and services, regardless of the geographical location. The architecture identifies specific interfaces requiring nationwide compatibility. Examples include the delivery of real-time traveler information to in-vehicle devices and the dedicated short-range interface between the vehicle and the roadside. Nationwide standards for these types of interfaces will allow travelers and commercial vehicles to use their compliant equipment anywhere within the United States.
- **Multiple Suppliers** – The architecture can encourage competition in the delivery of ITS services through the implementation of standards in areas where a standard is not necessarily required to provide a traveler with seamless operation of his ITS service. These interfaces will benefit from standards in allowing multiple suppliers of equipment and software that will directly connect to other ITS systems.
- **Ranges of Functionality** – The standard packages contain data flows that support several levels of service. For example, the *trip plan* data flow contains a large number of optional data fields. The standards developer is encouraged to maintain the flexibility in the data flow specifications to allow for multiple implementations.
- **Synergy** – As discussed above, the architecture began with a logical architecture that satisfied the identified user services. As a result, there are functions and data flows common to several of the services. These "processes" appear in several higher-level data flows, and because they come from a single source they support synergy and consistency.
- **Risk Reduction** – The architecture reduces risk to public providers, private providers and consumers. For public providers, existence of standards means that equipment purchased one year will be likely to operate with new equipment purchased several years from now. This also means that agencies will not be locked into specific vendors since all vendors

will be able to build to the same standard. For private providers, existence of standards means that they can gather information from multiple sources using well-defined message sets and thereby increase the level of service to their customers. For consumers, products built to a particular standard will allow a user to select their service provider from a number of companies, not just the company with which their equipment happens to be compatible.

Defined standards are fundamental to the establishment of nationally compatible and interoperable ITS deployments. Standards will enable deployment of consistent, non-interfering, reliable systems on local, regional and national levels. Open standards will further benefit the consumer by enhancing competition for the range of products necessary to implement the ITS user services. Larger markets for specific products will reduce production costs through economy of scale. Producers benefit from standards because they assure a wide market over which the product can be sold. As deployment occurs, diverse systems will be developed to address the special needs of urban, suburban and rural environments. Standards will ensure interoperability across these implementations without impeding innovation as technology advances and new approaches evolve.

Well-chosen, well-timed, and broadly accepted standards can provide the following frequently referenced benefits:

- **Interoperability between diverse systems** – This benefit facilitates cost-effective area-wide implementations that ultimately provide enhanced service to the consumer.
- **Preservation of investment** – Timely standards can reduce investments in multiple incompatible approaches, some of which will become casualties of natural selection in the market place.
- **Technology insertion** – Systems can be incrementally improved to take advantage of new technologies.
- **Creation of broader markets** – Interoperability standards set the stage for national and/or international markets. The lack of a standard may ultimately limit the size of the market.
- **Interchangeability** – Interchangeable equipment reduces capital costs through increased competition and reduces maintenance costs through smaller spares inventories of less expensive replacement parts.

Note that the adopted standards must be comprehensive to support interoperability. There are several examples in which hastily developed and adopted standards have not included sufficient specification to guarantee interoperability between standard-compliant systems.

8.2 Using Standards

More than 110 standards have been identified as part of the National ITS Architecture standard development activities. The task of working with public and private sector ITS community to develop these standards has been tasked to seven different standards development organizations (SDOs). These SDOs include:

- American Association of State Highway and Transportation Officials (AASHTO)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Organization for Standardization (ISO)
- Institute of Transportation Engineers (ITE)
- National Electrical Manufactures Association (NEMA)
- Society of Automotive Engineers (SAE)

Information on the complete list of ITS Standards can be found on the ITS Standards webpage at http://www.standards.its.dot.gov/.

While the Mississippi Statewide ITS Architecture is a comprehensive plan which includes various ITS applications, it does not cover every conceivable ITS technology. As such, not all ITS standards will be applicable to the existing and proposed projects. Table 8-1 summarizes the appropriate ITS standards for all existing and proposed projects in Mississippi.

Table 8-1. Key Standards Supporting the ITS Projects in Mississippi

***Status (as of December 2006):**

P – Published: Standards that are available for purchase.

A – Approved: Standards that have passed all necessary ballots and have been approved by a standards development organization, but not yet published.

B – In Ballot: Standards that are being voted upon by a committee or working group, or are undergoing other SDO procedures.

U – Under Development: Standards that are being written, but are not yet ready for a formal ballot.

S – Standard Development Work has been suspended; or standards have been withdrawn.

Standard Name	SDO	Document ID	Status*
Simple Transportation Management Framework (STMF)	AASHTO/ITE/ NEMA	NTCIP 1101	P
Octet Encoding Rules (OER) Base Protocol	AASHTO/ITE/ NEMA	NTCIP 1102	A
Transportation Management Protocols (TMP)	AASHTO/ITE/ NEMA	NTCIP 1103	A
Center-to-Center Naming Convention Specification	AASHTO/ITE/ NEMA	NTCIP 1104	A
CORBA Security Service Specification	AASHTO/ITE/ NEMA	NTCIP 1105	S
CORBA Near-Real Time Data Service Specification	AASHTO/ITE/ NEMA	NTCIP 1106	S
Global Object Definitions	AASHTO/ITE/ NEMA	NTCIP 1201	P
Object Definitions for Actuated Traffic Signal Controller Units	AASHTO/ITE/ NEMA	NTCIP 1202	P
Object Definitions for Dynamic Message Signs (DMS)	AASHTO/ITE/ NEMA	NTCIP 1203	P
Environmental Sensor Station (ESS) Interface Standard	AASHTO/ITE/ NEMA	NTCIP 1204	P

Standard Name	SDO	Document ID	Status*
Standard Name	SDO	Document ID	Status*
Object Definitions for Closed-Circuit Television (CCTV) Camera Control	AASHTO/ITE/ NEMA	NTCIP 1205	P
Object Definitions for Data Collection and Monitoring (DCM) Devices	AASHTO/ITE/ NEMA	NTCIP 1206	A
Object Definitions for Closed-Circuit Television (CCTV) Switching	AASHTO/ITE/ NEMA	NTCIP 1208	A
Data Element Definitions for Transportation Sensor Systems (TSS)	AASHTO/ITE/ NEMA	NTCIP 1209	A
Field Management Stations - Part 1: Object Definitions for Signal System Masters	AASHTO/ITE/ NEMA	NTCIP 1210	U
Object Definitions for Signal Control and Prioritization	AASHTO/ITE/ NEMA	NTCIP 1211	A
Weather Report Message Set for Environmental Sensor Stations	AASHTO/ITE/ NEMA	NTCIP 1301	U
TCIP Common Public Transportation (CPT) Objects	AASHTO/ITE/ NEMA	NTCIP 1401	P
TCIP Incident Management (IM) Objects	AASHTO/ITE/ NEMA	NTCIP 1402	P
TCIP Passenger Information (PI) Objects	AASHTO/ITE/ NEMA	NTCIP 1403	P
TCIP Scheduling/Runcutting (SCH) Objects	AASHTO/ITE/ NEMA	NTCIP 1404	P
TCIP Spatial Representation (SP) Objects	AASHTO/ITE/ NEMA	NTCIP 1405	P
TCIP On-Board (OB) Objects	AASHTO/ITE/ NEMA	NTCIP 1406	P
TCIP Control Center (CC) Objects	AASHTO/ITE/ NEMA	NTCIP 1407	P
TCIP Fare Collection (FC) Business Area Objects	AASHTO/ITE/ NEMA	NTCIP 1408	P
Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	AASHTO/ITE/ NEMA	NTCIP 2101	P
Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile	AASHTO/ITE/ NEMA	NTCIP 2102	P
Point-to-Point Protocol Over RS-232 Subnetwork Profile	AASHTO/ITE/ NEMA	NTCIP 2103	P
Ethernet Subnetwork Profile	AASHTO/ITE/ NEMA	NTCIP 2104	P
Transportation Transport Profile	AASHTO/ITE/ NEMA	NTCIP 2201	P
Internet (TCP/IP and UDP/IP) Transport Profile	AASHTO/ITE/ NEMA	NTCIP 2202	P
Simple Transportation Management Framework (STMF) Application Profile	AASHTO/ITE/ NEMA	NTCIP 2301	P
Trivial File Transfer Protocol (TFTP) Application Profile	AASHTO/ITE/ NEMA	NTCIP 2302	P
File Transfer Protocol (FTP) Application Profile	AASHTO/ITE/ NEMA	NTCIP 2303	P
Application Profile for DATEX-ASN (AP-DATEX)	AASHTO/ITE/ NEMA	NTCIP 2304	P
Application Profile for CORBA (AP-CORBA)	AASHTO/ITE/ NEMA	NTCIP 2305	S

Standard Name	SDO	Document ID	Status*
Application Profile for XML Message Encoding and Transport in ITS C2C Communications	AASHTO/ITE/ NEMA	NTCIP 2306	U
Information Profile for DATEX	AASHTO/ITE/ NEMA	NTCIP 2501	S
Information Profile for CORBA	AASHTO/ITE/ NEMA	NTCIP 2502	S
Commercial Vehicle Safety Reports	ANSI	ANSI TS284	P
Commercial Vehicle Safety and Credentials Information Exchange	ANSI	ANSI TS285	P
Commercial Vehicle Credentials	ANSI	ANSI TS286	P
Electronic Filing of Tax Return Data	ANSI	ANSI TS813	P
Transit Communications Interface Profile	APTA	TCIP Dialogs	U
Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band	ASTM	ASTM E2158-01	P
Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications	ASTM	ASTM E2213-02	P
Standard Practice for Metadata to Support Archived Data Management Systems	ASTM	ASTM WK7592	U
Standard Specification for Archiving ITS Generated Traffic Monitoring Data	ASTM	ASTM WK7604	U
Standard Provisional Specification for Dedicated Short Range Communication (DSRC) Data Link Layer	ASTM	ASTM PS 105-99	S
Logical Link (Layer 2) for DSRC 5.9 GHz	IEEE	IEEE 802.2	P
Standard for Message Sets for Vehicle/Roadside Communications	IEEE	IEEE 1455-1999	P
Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	IEEE	IEEE 1512-2000	P
Standard for Traffic Incident Management Message Sets for Use by EMCs	IEEE	IEEE 1512.1-2003	P
Standard for Public Safety IMMS for use by EMCs	IEEE	IEEE 1512.2-2004	P
Standard for Hazardous Material IMMS for use by EMCs	IEEE	IEEE 1512.3-2002	P
Standard for Common Traffic Incident Management Message Sets for Use in Entities External to Centers	IEEE	IEEE 1512.4	U
Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	IEEE	IEEE 1570-2002	P
Resource Manager for DSRC 5.9 GHz	IEEE	IEEE 1609.1	U
Application Services (Layers 6,7) for DSRC 5.9 GHz	IEEE	IEEE 1609.2	U
Communications Services (Layers 4,5) for DSRC 5.9 GHz (Future Standard)	IEEE	IEEE 1609.3	U
Medium Access Control (MAC) Extension & the MAC Extension Management Entity for DSRC 5.9 GHz	IEEE	IEEE 1609.4	U
Networking Services (Layer 3) for DSRC 5.9 GHz	ISO	ISO 21210	U
Standard for Functional Level Traffic Management Data Dictionary (TMDD)	ITE	ITE TM 1.03	A
Message Sets for External TMC Communication (MS/ETMCC)	ITE	ITE TM 2.01	A
Location Referencing Message Specification (LRMS)	SAE	SAE J2266	P

Standard Name	SDO	Document ID	Status*
Data Dictionary for Advanced Traveler Information Systems (ATIS)	SAE	SAE J2353	P
Message Set for Advanced Traveler Information System (ATIS)	SAE	SAE J2354	P
Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media	SAE	SAE J2369	P
Rules for Standardizing Street Names and Route IDs	SAE	SAE J2529	A
Messages for Handling Strings and Look-Up Tables in ATIS Standards	SAE	SAE J2540	P
RDS (Radio Data System) Phrase Lists	SAE	SAE J2540-1	P
ITIS (International Traveler Information Systems) Phrase Lists	SAE	SAE J2540-2	P
National Names Phrase List	SAE	SAE J2540-3	P

8.3 Mapping of Standards to Application Areas

Table 8-2 provides a guide to ITS standards that could be considered for use in different types of ITS projects in Mississippi. Each row in the table represents an ITS standard and each column represents one of nineteen application areas. The standards included in the table are those that relate to the subsystems and information flows between them that are likely to be included in the ITS projects in Mississippi. The application areas are deployment-oriented categories that focus on specific ITS services or systems. Each application area consists of one or more interfaces in the National ITS Architecture. They were chosen so that agencies and service providers can easily find the application area within which a particular ITS project fits. Most ITS projects will relate to only one application area, although larger projects may relate to more than one application area.

Note that not all interfaces in the Mississippi Statewide ITS Architecture are represented by an application area. This is because not all interfaces are currently represented by approved or published ITS standards. Additional application areas may be added in the future as additional ITS standards become available. The inclusion of a standard in an application area indicates that standard may apply—not that it must apply. On the other hand, the exclusion of a standard from an application area does not mean that the standard may not be used in a project for that application area. For example, traffic management standards do not include traveler information standards; however, traffic management centers may benefit from knowing what traveler information systems do with the information.

Two key standards that support ITS projects in Mississippi are not included in the Application Area Matrix. The standards, listed below, are mapped to the National ITS Architecture and are assigned to application areas not included in the matrix.

SDO	*Doc ID*	*Standard Name*
ANSI	TS284	Commercial Vehicle Safety Reports
ANSI	TS813	Electronic Filing of Tax Return Data

Table 8-2. Key ITS Standards Application Area Matrix for Mississippi

			Application Area																				
			Center to Center						Center to Roadside							Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle			
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection		
AASHTO	1101	Simple Transportation Management Framework (STMF)							●	●	●	●	●	●	●								
AASHTO	1102	Octet Encoding Rules (OER) Base Protocol	●	●	●	●	●	●	●	●	●	●	●	●	●								
AASHTO	1103	Transportation Management Protocols (TMP)							●	●	●	●	●	●	●								
AASHTO	1104	Center-to-Center Naming Convention Specification	●	●	●	●	●	●															
AASHTO	1105	CORBA Security Service Specification	●	●	●	●	●	●															
AASHTO	1106	CORBA Near-Real Time Data Service Specification	●	●	●	●	●	●															
AASHTO	1201	Global Object Definitions		●					●	●	●	●	●	●	●					●			
AASHTO	1202	Object Definitions for Actuated Traffic Signal Controller Units											●										
AASHTO	1203	Object Definitions for Dynamic Message Signs (DMS)								●													
AASHTO	1204	Environmental Sensor Station (ESS) Interface Standard							●		●												
AASHTO	1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control							●					●	●								

			Application Area																				
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle		
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection		
AASHTO	1206	Object Definitions for Data Collection and Monitoring (DCM) Devices							●		●			●									
AASHTO	1208	Object Definitions for Closed Circuit Television (CCTV) Switching							●					●	●								
AASHTO	1209	Data Element Definitions for Transportation Sensor Systems (TSS)							●			●	●	●									
AASHTO	1210	Field Management Stations - Part 1: Object Definitions for Signal System Masters				●							●										
AASHTO	1211	Object Definitions for Signal Control and Prioritization		●																	●		
AASHTO	1301	Weather Report Message Set for Environmental Sensor Stations									●												
AASHTO	1401	TCIP Common Public Transportation (CPT) Objects	●				●										●						
AASHTO	1402	TCIP Incident Management (IM) Objects	●	●			●									●	●						
AASHTO	1403	TCIP Passenger Information (PI) Objects	●				●										●	●					
AASHTO	1404	TCIP Scheduling/Runcutting (SCH) Objects	●				●										●						

			Application Area																		
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle	
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection
AASHTO	1405	TCIP Spatial Representation (SP) Objects	●																		
AASHTO	1406	TCIP On-Board (OB) Objects	●													●	●				
AASHTO	1407	TCIP Control Center (CC) Objects	●				●									●	●				
AASHTO	1408	TCIP Fare Collection (FC) Business Area Objects	●				●										●	●			
AASHTO	2101	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile							●	●	●	●	●	●	●						
AASHTO	2102	Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile							●	●	●	●	●	●	●						
AASHTO	2103	Point-to-Point Protocol Over RS-232 Subnetwork Profile							●	●	●	●	●	●	●						
AASHTO	2104	Ethernet Subnetwork Profile	●	●	●	●	●	●	●	●	●	●	●	●	●						
AASHTO	2201	Transportation Transport Profile							●	●	●	●	●	●	●						
AASHTO	2202	Internet (TCP/IP and UDP/IP) Transport Profile	●	●	●	●	●	●	●	●	●	●	●	●	●						
AASHTO	2301	Simple Transportation Management Framework (STMF) Application Profile							●	●	●	●	●	●	●						
AASHTO	2302	Trivial File Transfer Protocol (TFTP) Application Profile							●	●	●			●	●						

			Application Area																			
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle	
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection
AASHTO	2303	File Transfer Protocol (FTP) Application Profile	●	●	●	●	●	●	●	●	●			●	●						
AASHTO	2304	Application Profile for DATEX-ASN (AP-DATEX)	●	●	●	●	●	●													
AASHTO	2305	Application Profile for CORBA (AP-CORBA)	●	●	●	●	●	●													
AASHTO	2306	Application Profile for XML Message Encoding and Transport in ITS C2C Communications	●	●	●	●	●	●													
AASHTO	2501	Information Profile for DATEX	●	●	●	●	●	●													
AASHTO		Information Profile for CORBA	●	●	●	●	●	●													
ANSI	TS285	Commercial Vehicle Safety and Credentials Information Exchange	●																		
ANSI	TS286	Commercial Vehicle Credentials	●																		
APTA	TCIP Dialogs	Transit Communications Interface Profile		●			●									●	●	●			
ASTM	E2158-01	Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band																		●	●

			Application Area																				
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle		
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection
ASTM	E2213-02	Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications																		●	●
ASTM	WK7592	Standard Practice for Metadata to Support Archived Data Management Systems	●																		
ASTM	WK7604	Standard Specification for Archiving ITS Generated Traffic Monitoring Data	●																		
ASTM	PS 105-99	Standard Provisional Specification for Dedicated Short Range Communication (DSRC) Data Link Layer																		●	
IEEE	802.2	Logical Link (Layer 2) for DSRC 5.9 GHz																		●	●
IEEE	1455-1999	Standard for Message Sets for Vehicle/Roadside Communications																			●

			Application Area																				
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle		
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection
IEEE	1512-2000	Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	●	●																			
IEEE	1512.1-2003	Standard for Traffic Incident Management Message Sets for Use by EMCs	●	●		●																	
IEEE	1512.2-2004	Standard for Public Safety IMMS for use by EMCs	●	●																			
IEEE	1512.3-2002	Standard for Hazardous Material IMMS for use by EMCs	●	●																			
IEEE	1512.4	Standard for Common Traffic Incident Management Message Sets for Use in Entities External to Centers	●	●																			
IEEE	1570-2002	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection																	●				
IEEE	1609.1	Resource Manager for DSRC 5.9 GHz																			●		●
IEEE	1609.2	Application Services (Layers 6,7) for DSRC 5.9 GHz																			●		●
IEEE	1609.3	Communications Services (Layers 4,5) for DSRC 5.9 GHz																			●		●
IEEE	1609.4	Medium Access Control (MAC) Extension & the MAC Extension Management Entity for DSRC 5.9 GHz																			●		●

			Application Area																			
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle	
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection
ISO	21210	Networking Services (Layer 3) for DSRC 5.9 GHz																		●	●
ITE	TM 1.03	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	●	●		●	●															
ITE	TM 2.01	Message Sets for External TMC Communication (MS/ETMCC)	●	●		●	●															
SAE	J2266	Location Referencing Message Specification (LRMS)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
SAE	J2353	Data Dictionary for Advanced Traveler Information System (ATIS)	●			●	●	●								●	●	●				
SAE	J2354	Message Set for Advanced Traveler Information System (ATIS)	●			●	●	●								●	●	●				
SAE	J2369	Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media																●				
SAE	J2529	Rules for Standardizing Street Names and Route IDs	●			●	●	●								●	●	●				
SAE	J2540	Messages for Handling Strings and Look-Up Tables in ATIS Standards	●			●	●	●								●	●	●				

			Application Area																				
			Center to Center						Center to Roadside								Center to Vehicle/Traveler			Roadside to Roadside	Roadside to Vehicle		
SDO	Doc ID	Standard Name	Data Archival	Incident Management	Rail Coordination	Traffic Management	Transit Management	Traveler Information	Data Collection/Monitoring	Dynamic Message Signs	Environmental Monitoring	Ramp Metering	Traffic Signals	Vehicle Sensors	Video Surveillance	Mayday	Transit Vehicle Communications	Traveler Information	Highway Rail Intersection (HRI)	Signal Priority	Toll/Fee Collection
SAE	J2540-1	RDS (Radio Data System) Phrase Lists	●			●	●	●								●	●	●					
SAE	J2540-2	ITIS (International Traveler Information Systems) Phrase Lists	●			●	●	●								●	●	●					
SAE	J2540-3	National Names Phrase List	●			●	●	●								●	●	●					

9. PROJECT SEQUENCING

A project sequence defines the order in which ITS projects may be implemented. A good sequence is based on a combination of two factors:

- **Prioritization of projects based on existing conditions and stakeholder needs.** The ITS projects were prioritized to reflect a deployment path (sequence) on stakeholder needs. Although the information collected through stakeholder surveys and meetings was the basis of the ITS Architecture, technology, funding opportunities and requirements continue to evolve. It is expected the MDOT will reevaluate and reprioritize projects frequently.

- **Project dependencies, based on how successive ITS projects can build upon one another.** Project dependencies influence the project sequencing. It is beneficial to identify the information and functional dependencies between projects.

In most cases, the sequence of currently planned projects has already been programmed and can simply be extracted from existing transportation plans. Successive projects will then be added to the sequence based on the project dependencies and other planning factors.

The process for determining the sequence of projects for the Mississippi Statewide ITS Architecture includes three steps:

- Review of the Mississippi Statewide ITS Architecture
- Review of relevant planning documents
- Stakeholder feedback

The Mississippi Statewide ITS Architecture represents a roadmap for transportation systems deployment and integration in Mississippi over the next 20 years. A list of ITS projects that have currently been planned over the next 20 years was identified in Table 9-1. Through the above process, the recommended ITS project sequencing was determined. The list was further refined to establish which projects were allocated to the short term (within 5 years), medium term (5 to 10 years), and long term (over 10 years). This provided a priority for the list of projects denoting a general order for project implementation. It should be noted that Table 9-1 does not include all planned ITS projects within the state. It mainly consists of projects that may have implications to ITS operations and management at statewide and broader regional levels. It should be noted that the majority of planned ITS projects that have local and regional significance and implications will be included in the regional ITS Architectures that are being developed by the MPOs throughout the state.

Table 9-1. Planned ITS Projects for Mississippi Statewide ITS Architecture

*Timeframe: Short Term = within 5 years; Medium Term = 5 to 10 years; and Long Term = over 10 years

No.	Project	Description	Timeframe*	Dependency
1	MDOT Communications Master Plan	Statewide MDOT initiative in coordination with state agencies such as Mississippi ITS. This project is proposed to develop a comprehensive statewide Master Plan to address various types of communication needs in MDOT districts and the entire state. This plan should be developed in coordination with the Mississippi Information Technology Services and consider the existing infrastructure already in place in the state. The plan should also address opportunities to meet the communications requirements of the Regional ITS Architectures.	Short Term	Stand alone. However, the communications requirements identified in the Statewide and Regional ITS Architectures should be reviewed as part of this project.
2	MDOT Statewide Incident Management Plan	This project will define agency roles, responsibilities, operations, and procedures for interurban incident management. Methods of incident detection, verification, motorist information, response, site management and clearance will be covered.	Short Term	Stand alone
3	MHP Emergency Vehicles AVL	AVL system to track emergency vehicles is planned	Short Term	Stand alone
4	Regional ITS Architectures Development	This effort will build on the architecture work that has already been completed to develop detailed regional architecture specific to the four MPO regions: Desoto County, Hattiesburg, Gulf Coast, and Jackson. As part of this project, the MPOs will reference the MDOT and Statewide Architectures to establish linkages, coordination, and opportunities for information with systems outside the MPO regions.	Short Term	Stand alone
5	County and City Portable DMS	Used to direct traffic for special events, maintenance and construction, and incident management.	Short and Medium Terms	Stand alone
6	MDOT Dynamic Message Signs	Install DMSs across Mississippi. The potential locations include high volume loads/high accident roads, vicinity of major attractions, airports, and parking facilities. The specific locations have been identified in the MULTIPLAN.	Short and Medium Terms	Stand alone

No.	Project	Description	Timeframe*	Dependency
7	Railroad Crossing Control	General / Statewide initiative. Received much interest in Jackson and Gulf Coast. The deployment of integrated train detection and traffic control is considered a cost effective, near-term deployment as a result of the ability to deploy individual systems in select areas, and the commercial availability of such systems.	Short and Medium Terms	Stand alone
8	Rural Transit Systems	ITS systems including CAD dispatch, AVL/GPS, electronic payment, pre-trip planning, electronic signs and/or voice annunciations on buses or at stops, on-board security cameras, website, kiosks may be planned	Short and Medium Terms	Stand alone. If funding is available, this project may be implemented in conjunction with #9.
9	Urban Transit Systems	ITS systems including CAD dispatch, AVL/GPS, electronic payment, pre-trip planning, electronic signs and/or voice annunciations on buses or at stops, on-board security cameras, website, kiosks, and signal priority may be planned	Short and Medium Terms	Stand alone. If funding is available, this project may be implemented in conjunction with #9.
10	MDOT Portable TMC	The potential locations include construction work zones, routes leading to special events, airports, etc. when there is a need for temporary traffic control. In the short term the project utilizes one component of the portable TMC (i.e., portable DMSs and/or portable HAR). The specific locations are identified in the MULTIPLAN.	Short and Medium Terms	Stand alone
11	County and City Surveillance Equipment	Monitor roadway conditions via CCTV and/or traffic sensors.	Short, Medium, and Long Terms	Stand alone
12	MDOT CCTV Monitoring and Surveillance	The candidate locations include high accident roads, major interchanges and roadway construction sites. CCTV will be also appropriate for rest areas for security purposes.	Short, Medium, and Long Terms	Stand alone
13	MDOT Pre-planned Detour Routes	This project involves the development of diversion routes to shift traffic away from bottlenecks caused by congestion, incidents, or construction. In the short term, diversion routes from limited access highway to limited access highway will be developed. In the medium term, diversion routes from major arterial roadways to limited access highways will be defined. In the long term, diversion routes from limited access highway to major arterial roadway and major arterial roadway to major arterial roadway will be identified.	Short, Medium, and Long Terms	This project should be coordinated with #2 – Statewide Incident Management Plan.

No.	Project	Description	Timeframe*	Dependency
14	MDOT Statewide TMC Upgrades	This project consists of upgrading existing equipment and technology associated with the MDOT Statewide TMC located in Jackson. Upgrades may include communications, computer hardware, software, and physical TMC layout. Dedicated TMC operations staff should also be provided in the short term.	Short, Medium, and Long Terms	This project should consider opportunities and requirements for integration with #12, 16, 25, 36, and 39.
15	MDOT MSTraffic.com Improvements	In the short term, additional camera images and incident reports from MDOT Districts across the State will be fed to MSTraffic.com. In the medium and longer terms, speed and travel time data, route planning, transit traveler information, airport/airline information could be added.	Short, Medium, and Long Terms	Improvements could be implemented in concert with #12, 14, 16, 24, and 33.
16	MDOT Vehicle Detection System	General / Statewide initiative, but tends to be focused on high-volume locations or locations with high variability in traffic volume. Traffic detection systems should be placed at 1/2 mile spacing or between interchanges. Whenever possible, non-intrusive detectors should be used. Such technology can be installed and maintained with minimal disruption to traffic flow.	Short, Medium, and Long Terms	Stand alone
17	Emergency Vehicle Signal Preemption	This project will deploy signal preemption in corridors in urban areas with high density of emergency vehicle response vehicles (e.g. fire routes) and congested traffic conditions.	Short, Medium, and Long Term	Stand alone
18	Establishment of MDOT ITS Division	In the short term, the "Division" will likely be contained within the current Traffic Engineering Division. In the medium term, the Division would stand alone within the Operations Unit. The ITS Division shall be responsible for planning, engineering, design, and management of all ITS deployments.	Short to Medium Term	Stand alone
19	MDOT 511 Traveler Information Phone System	The viability of this project will depend upon results of the Federal 511 planning grant.	Medium Term	#12, 14, and 16 may provide necessary data for the system.
20	MDOT Accident Database	A Safety Analysis Management System (SAMS) is planned as a Web-based application providing interactive GIS tools to assist in the query, visualization, and analysis of crash data.	Medium Term	Stand alone
21	MDOT Speed Warning System	General / Statewide initiative. Has particular applicability in high accident locations (e.g. Waterworks Curve in Jackson) and areas prone to fog (e.g. Gulf Coast).	Medium Term	Stand alone

No.	Project	Description	Timeframe*	Dependency
22	MDOT Automated Truck Rollover Warning System	MDOT is considering installing an automated truck rollover warning system at locations notorious for truck rollover accidents. The system determines the probability that a truck will roll over at different speeds, based on sensing the truck's weight and load characteristics.	Medium Term	Stand alone
23	MDOT Cellular Phone System for Incident Reporting	This project enables motorists to report incidents to the MDOT Statewide TMC using a cellular phone number such as *999. When used statewide, these systems could allow users to contact the local law enforcement, towing companies, ambulance services and local transportation organizations highway helper vehicles.	Medium Term	Stand alone
24	MDOT Commercial Vehicle Traveler Information Network	This project would expand the GoMDOT's traveler information capabilities by providing specific information to truck operators via the internet and/or public kiosks at truck stops. The types of information might include road closures, incident, weather (i.e., fog, flooding), construction, and special permit routing. The potential locations include Desoto County where truck traffic coming off US 78 is very heavy. Another possible location is at the proposed Osyka Trucker Safety Rest Area which is one of the MS identified ITS/CVO projects.	Medium Term	Stand alone. Kiosks could be deployed with #30.
25	MDOT Communication Backbone	This project will establish a more permanent approach for the primary communication links between MDOT Central Office and the Districts. As more ITS functionality is added to MDOT's transportation system, the demand on the communications infrastructure will increase.	Medium Term	Communications Master Plan should provide directions to this project.
26	MDOT CVSN Credentialing Infrastructure Systems	It is planned to provide Mississippi Public Service Commission and MDOT enforcement personnel with real-time safety and credential information. The national CVISN system databases will be connected and accessed, including CDLIS, SAFER, MCMIS, NLETS, etc.	Medium Term	Stand alone
27	MDOT Highway Advisory Radio	This project will include an installation of HAR on high accident routes and in the vicinity of major attractions, airports, and parking facilities.	Medium Term	Stand alone

No.	Project	Description	Timeframe*	Dependency
28	MDOT Maintenance and Construction Vehicles AVL/GPS	Install AVL/GPS capability on additional snow plows to aid the tracking of maintenance actions including winter work, summer maintenance, and operations during emergencies, and data ingestion into maintenance decision support systems and in planning future roadside work. Also make information available for online viewing.	Medium Term	Stand alone
29	MDOT Trailblazer Directional Signs	The possible deployment locations include high volume / high accident routes, and in the vicinity of major attractions, airports, and parking facilities.	Medium Term	Stand alone
30	MDOT Traveler Information Kiosks	This project would require internet capable kiosks. Information could be provided by same internet database that which supports GoMDOT. The possible locations include rest areas multi-modal centers and other locations where visitors and transit users congregate.	Medium Term	This project could be implemented in conjunction with #24.
31	County Emergency Operation Centers	This includes a series of project to implement emergency management centers at selected counties to manage countywide emergency operations and homeland security practices during major emergencies and disasters.	Medium and Long Terms	Stand alone
32	MDOT Highway Service Patrol	In the medium term MDOT should deploy 1-2 vehicles operating on fixed routes around Jackson and will communicate with the MDOT TMC via voice communications. In the long term additional vehicles/routes can be added in Jackson, Gulf Coast, and DeSoto County. Vehicles will be equipped with AVL capability.	Medium and Long Terms	Stand alone. Implementation of AVL technology could be done in conjunction with #28.
33	MDOT Weather Sensors	Additional weather sensors to collect pavement, surface, and ambient temperature, wind speed and direction, pavement wet/dry, precipitation and relative humidity could be deployed. Communication links with MDOT sensors in rural areas will be installed.	Medium and Long Terms	Stand alone. Information collected by the sensors could be made available on the MSTraffic.com.
34	MDOT Automated Gate Closures	This project would provide remote controlled operated gates to close roadways primarily during adverse weather conditions. Implementing technology that will allow the closure to be implemented (gates to be closed and signs activated as needed) from a remote location such as the County Emergency Operations Center or MDOT Statewide TMC can simplify some of the issues surrounding closures.	Medium to Long Term	Stand alone

No.	Project	Description	Timeframe*	Dependency
35	MDOT Reversible Lane Management	This project will be deployed at locations where there is a high imbalance in traffic flows. The candidate roadway should have provisions to reverse direction on a specific lane when such conditions arise. A potential application in the state is along the hurricane evacuation routes such as I-59 and US 49 in the Gulf Coast. Also, major event locations in the state are candidates for reversible lane management during peak entry and exit times.	Medium to Long Term	Stand alone
36	MDOT Statewide TMC/E-911 Integration	In the medium term, CAD incident data information from the MHP dispatch centers would be sent to MDOT Statewide TMC. Over time camera images would shared and additional police/fire/E-911 dispatch centers would be integrated with the MDOT Statewide TMC and/or Regional or District TMCs.	Medium to Long Term	Interface and integration requirements could be identified and implemented in coordination with #14 and 39.
37	MDOT TMC and Railroad Operations Coordination	General / Statewide initiative. Received much interest in Jackson and Gulf Coast. This project will provide coordination between rail operations and traffic management centers. Rail operators should include: Kansas City Southern and Canadian National / Illinois Central, CSC, BNSF, Norfolk Southern Railroads.	Medium to Long Term	Stand alone
38	County and City Smart Parking Management Systems	Smart parking systems will include transit information signs, information kiosks during parking facility/garage construction.	Long Term	Stand alone
39	MDOT District Level TMCs	This project includes a development of northern and southern MDOT TMCs. Initially, centers will start out small with responsibility for controlling traffic signals. The centers will then integrate other existing ITS elements such as DMS, HAR, and CCTV.	Long Term	Relationships and interfaces with #12, 14, 16, 25, and 36 should be considered.

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10. AGREEMENTS

The Mississippi Statewide ITS Architecture provides both a technical and institutional framework for the deployment of ITS in the state of Mississippi. Institutional integration involves cooperation and coordination between various agencies and jurisdictions to achieve seamless operations and interoperability.

The previous sections of the report identified the stakeholder roles and responsibilities, key market packages, and ITS deployment activities that would require establishment of an electronic link between organizations. From an institutional integration perspective, these electronic links or interfaces may require the establishment of some form of agreement to define roles and responsibilities of each party.

There are several types of arrangements associated with the interfaces identified in the Mississippi Statewide ITS Architecture. Information sharing and exchanges between systems require knowledge of the transmission protocol and data formats to ensure compatibility. Coordinating field device operations owned by different agencies requires defined procedures for submitting message requests and rules governing when such requests can be honored. Such coordination may be done with informal arrangements such as a Memorandum of Understanding (MOU). Sharing control of field devices operated by different agencies could involve more liability issues, which may require more formal agreements. Coordinated incident response may also require formal agreements, but also requires group training of personnel from various agencies. Agreements may be obtained for data sharing, procedure, operation, maintenance, and training.

Some common types of agreements are listed in Table 10-1. The agreement process may begin with something as simple as a handshake agreement. However, once interconnections and integration of systems begin, agencies may want to have something more substantial in place. A documented agreement will aid agencies in planning their operational costs, understanding their respective roles and responsibilities, and build trust for future projects. Formal agreements may be necessary where funding or financial arrangements are defined or participation in large regionally significant projects is required.

Table 10-2 provides a list of the existing agreements identified in the stakeholder survey.

Table 10-3 presents a list of existing and potential agreements that would be required for the implementation and operations of an integrated ITS system in the state of Mississippi.

Table 10-1. Types of Agreements

Type of Agreement	Description
Handshake Agreement	▪ Early agreement between one or more partners ▪ Not recommended for long term operations.
Memorandum of Understanding (MOU)	▪ Initial agreement used to provide minimal detail and usually demonstrating a general consensus. ▪ Used to expand a more detailed agreement like an Interagency Agreement that may be broad in scope but contains all of the standard contract clauses required by a specific agency. ▪ May serve as a means to modify a much broader Master Funding Agreement, allowing the master agreement to cover various ITS projects throughout the region and the MOUs to specify the scope and differences between the projects.
Interagency Agreement	▪ Between public agencies (i.e., transit authorities, cities, counties, etc.) for operations, services or funding ▪ Documents responsibility, functions and liability at a minimum.
Intergovernmental Agreement	▪ Between governmental agencies (i.e., Agreements between universities and State DOT, MPOs and State DOT, etc.)
Operational Agreement	▪ Between any agency involved in funding, operating, maintaining or using the right of way of another public or private agency. ▪ Identifies respective responsibilities for all activities associated with shared systems being operated and / or maintained.
Funding Agreement	▪ Documents the funding arrangements for ITS projects (and other projects) ▪ Includes at a minimum standard funding clauses, detailed scope, services to be performed, detailed project budgets, etc.
Master Agreements	▪ Standard contract and / or legal verbiage for a specific agency and serving as a master agreement by which all business is done. These agreements can be found in the legal department of many public agencies. ▪ Allows states, cities, transit agencies and other public agencies that do business with the same agencies over and over (i.e., cities and counties) to have one Master Agreement that uses smaller agreements (i.e., MOUs, Scope of Work and Budget Modifications, Funding Agreements, Project Agreements, etc.) to modify or expand the boundaries of the larger agreement to include more specific language.

Table 10-2. Existing Agreements from Survey

Type of Agreement	Description	Associated Stakeholder
Interagency Transit Operations Agreement	Some agreements are in place to coordinate public transportation services for cities, counties, and regional areas.	Mississippi Cities and Counties
Interagency Incident Response Handshake Agreement	Handshake agreement between County EMA/CD personnel and local media outlets	Mississippi Counties and Media
Interagency Weather Information Memorandum of Agreement	Addresses sharing of information from National Weather Service to state and regional agencies and organizations.	Mississippi DOT, Mississippi EMA, National Weather Service, Regional Airport, State and Federal Fire Agencies
Interagency Maintenance Agreement	City Engineering departments working to maintain traffic signals in a jurisdiction.	City Engineering Departments

Table 10-3. Potential Agreements

Agreement	Description	Associated Stakeholder
Inter-State Data Sharing Agreement	Formal agreements are required to cover the exchange of information between state DOTs. The data may include 511 traveler information, road conditions, traffic flow, etc.	State DOTs
Inter-State Operations Agreement	Address system integration, equipment operation coordination, equipment maintenance, operational information exchanging and other issues across state borders. Equipment may include CCTV, DMS, etc.	State DOTs, County and City Traffic Management Agencies
Inter-State Incident Response Coordination Agreement	Support incident information notification, incident response coordination, resource coordination, etc. among multiple agencies across state borders.	State DOTs, State Patrols, County and City Public Safety Agencies, County and City Traffic Management and Maintenance Agencies, other agencies

Agreement	Description	Associated Stakeholder
Inter-Agency Data Sharing Agreement	Formal agreements are required to cover the exchange of data between different agencies in different regions. However, informally, the exchange of information may occur on an as-needed basis. Data may include traffic flow, video images, road weather, road conditions, etc.	MDOT, MHP, County and City Traffic Management Agencies, County and City Public Safety Agencies, Media Outlets, Private Information Service Providers
Inter-Agency Operations Agreement	Address equipment operation coordination, equipment maintenance, operational information exchange and other issues. Equipment may include traffic signal systems, DMS, CCTV, etc.	MDOT, MHP, County and City Traffic Management Agencies, County and City Public Safety Agencies
Multi-Agency Communication Infrastructure Sharing Agreement	There are multiple examples and opportunities for the sharing of communications infrastructure throughout the regions. A regional plan and subsequent agreements that define responsibilities could result in the communications network required to link the various ITS applications together.	MDOT, County and City
Inter-Agency Road Maintenance/ Snow Removal Agreement	Define roles and responsibilities for roadway maintenance as well as snow removal.	MDOT, County and City Maintenance Agencies
Multi-Agency EMS Communications Integration Agreement	Integrated EMS communications allows for quickly sharing of current incident response status between allied response agencies and creates a flow of information that reduces or eliminates delay due to a lag in communications.	County and City Public Safety Agencies
Multi-Agency Incident Response Coordination Agreement	Support incident information exchange, incident response coordination, resource coordination, etc. among multiple agencies in different regions.	MDOT, MHP, County and City Public Safety Agencies, County and City Traffic Management and Maintenance Agencies, other agencies
Multi-Agency Disaster Response Coordination Agreement	Define roles, responsibilities, and functions for disaster response, recovery and evacuation and reentry management.	Mississippi Public Safety Division, MEMA, MDOT, MHP, County and City Public Safety Agencies, County and City Traffic Management and Maintenance Agencies, Transit Agencies, other agencies
Multi-Agency Disaster Information Coordination Agreement	Define roles, responsibilities and functions for accessing and disseminating disaster information.	Mississippi Public Safety Division, MHP, MDOT, County and City Public Safety Agencies

Agreement	Description	Associated Stakeholder
Multi-Agency Limited Liability Agreements	Agreements will be developed to address the varying levels of liability limitation associated with the various agencies that would need to work together to enable coordinated, multi-agency transportation and emergency management strategies.	Agencies involved into transportation and emergency management.
Transit Electronic Payment Agreement	Support transit electronic payment systems. Agreements may define roles and responsibilities of transit agencies and financial institution to share information such as revenue from smart cards, etc.	Transit Agencies, Parking Operators, Financial Institutions
Transit Bus Signal Priority Agreement	Allow transit vehicles to activate signal priority at signalized intersections.	Transit Agencies, MDOT, County and City Traffic Management Agencies
Emergency Vehicle Signal Preemption Agreement	Define roles, responsibilities and functions for emergency vehicle preemption at signalized intersections	County and City Public Safety Agencies, MDOT, MHP, County and City Traffic Management Agencies
Railroad Crossing Management Agreement	Define roles, responsibilities and functions for rail grade crossing coordination and optimization at signalized intersections.	Railroad Companies, MDOT, County and City Traffic Management Agencies
Private Public Partnership	Agreement between a private vendor who will be running the toll operations on the Airport Parkway and MDOT.	Private Partnership Toll Facility Operations, MDOT

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11. IMPLEMENTATION AND INTEGRATION STRATEGY

A crucial part of developing an ITS Architecture is establishing an approach to using it. An ITS Architecture provides guidance for planning ITS projects within a region. It also provides information that can be used in the initial stages of project definition and development. This section of the report presents the approach for integrating the Mississippi Statewide ITS Architecture into the transportation planning process and leveraging the Architectures in ITS project definition. In addition, opportunities and considerations for integrating ITS projects and systems at the regional and statewide levels, especially for systems providing traffic management, incident management, and traveler information functions, are discussed.

11.1 Using ITS Architecture in Planning and Project Definition

The Mississippi Statewide ITS Architecture represents a detailed plan for the evolution of the ITS systems in the State and can be used to support transportation planning efforts and ITS project development efforts at state and regional levels.

Support Transportation Planning Process
Once an ITS architecture has been created, it can be used as a key reference in the transportation planning process. This will ensure all proposed ITS projects are consistent with the ITS architecture and additional integration opportunities are considered, leading to more efficient implementations. The following sections describe three aspects of the transportation planning process.

Long Range Transportation Plan
One of the principal planning documents is Mississippi's Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN). Phase 1 of the plan serves as the state's blueprint for transportation planning until more detailed steps in Phase 2 are outlined. Overall, MULTIPLAN will provide the direction for planning and developing the state's transportation system to help move the state productively and prosperously into the future. MULTIPLAN addresses the needs of the transportation system at local, regional, and state levels and how those needs can achieve economic development objectives, contribute to strived environmental stewardship ideals, and improve the quality of life for Mississippi citizens. The plan is reviewed approximately every five years to reflect changing situations. MDOT is responsible for developing and maintaining the two phases of MULTIPLAN, which are approved by the Mississippi Transportation Commission. Phase 2 is nearing completion and provides more detailed implementation steps.

The Mississippi Statewide ITS Architecture can serve as an input to MULTIPLAN. The ITS services and projects identified in the Statewide ITS Architecture can support the development of long-range and short-range strategies/actions during the state transportation planning that lead to an integrated, efficient inter-modal transportation system. The descriptions of the goals and attributes of the systems and services included in the Statewide ITS Architecture can support measurement assessment during the state transportation planning. The Project Sequencing from the Statewide ITS Architecture can assist the development of prioritized projects and address the consistency of proposed transportation investments in the financial plan, which is a part of MULTIPLAN. In addition, the Statewide ITS Architecture provides a framework for analyzing

how ITS elements are related and identifying areas for potential coordination and cooperation among agencies. This can promote both systems and inter-jurisdictional integration during the transportation planning process.

ITS Strategic Plans

MULTIPLAN incorporates the objectives of the Mississippi's ITS Strategic Plan into its overall framework. The ITS Strategic Plan provides an approach for implementing various MDOT ITS programs and projects. The plan is dynamic in nature and can be altered to reflect changes in policy considerations, state financial conditions, newly identified transportation needs, and new advances in technology. The ITS Strategic Plan also features a strategy for implementing projects in the short-term (0-5 years), medium-term (5-10 years), and long-term (beyond 10 years) and makes recommendations for taking appropriate steps for successful ITS development. The Statewide ITS Architecture can support what has been developed in the ITS Strategic Plan and assist in the prioritization of ITS projects scheduled for short-, medium-, and long-term implementation.

Other Planning Activities

The Mississippi Statewide ITS Architecture can also support other planning activities. The state's Comprehensive Emergency Transportation Response Plan (CETRP) identifies emergency policies, responsibilities, and procedures for the use of highways and highway facilities throughout the state. The plan is implemented under the following conditions: 1) upon the declaration of a national emergency by the President of the United States, 2) by concurrent resolution of the Congress, 3) by order of the Chief Executive of the State of Mississippi, or 4) in the absence of such specific direction and upon occurrence of a state or national emergency due to a natural, man-made or technological event.

Support Programming and Budgeting

In addition to supporting the transportation planning process, the Statewide ITS Architecture can assist in the development of the Statewide Transportation Improvement Program (STIP) and in the budgeting for planning projects.

Transportation Improvement Program

The STIP is a primary transportation planning output that can be supported by the Statewide ITS Architecture. MDOT sought the cooperation of several agencies at the local, regional, and state level in developing its STIP. The STIP is developed by incorporating into a single document the portions of the annual transportation improvement programs (TIPs) being funded by the FHWA and FTA within Mississippi. The STIP is a three-year listing of projects within the state proposed for federal-aid funding under Title 23 (Federal Highway Funding) and Title 49 (Federal Transit Assistance) of the United States Code. The STIP is prepared annually and the projects in the STIP should be consistent with the MULTIPLAN and the long range transportation plans prepared by the MPOs.

As part of the STIP preparation, a project prioritization and selection process is conducted, where the Statewide ITS Architecture and relevant regional ITS architecture(s) can play a role. The Project Sequencing output from these ITS architectures can be an input to prioritization. Integration opportunities identified in the Statewide ITS Architecture can be used to better define

the full benefits of ITS projects. In addition, some of the project description information might be available from the outputs of the Statewide ITS Architecture, specially the Project Sequencing output.

In addition to the State Transportation Plan and STIP planning, the Statewide ITS Architecture can be considered to support other transportation planning activities or services associated with ITS projects or projects with ITS elements in the state.

Capital Budgeting
The Mississippi Statewide ITS Architecture will define existing and planned ITS elements for stakeholders at all levels and how those elements interface with other existing or planned ITS elements in the state. The results of this process can be used by all stakeholders and organizations to define ITS projects and use that information in their budgeting process.

Support ITS Project Development
The Statewide ITS Architecture can be used for support in the ITS project development cycle. A typical ITS project development cycle begins with project definition, followed by Request for Proposal (RFP) generation, leading to project implementation. Information in the Statewide ITS Architecture can assist in all three of these areas of project development.

Project Definition
Project Definition may occur at several levels of detail. Early in the planning process a project may be defined only in terms of the transportation services it will provide, or by the major system pieces it contains. At some point prior to the beginning of implementation the details of the project must be developed. This could include further system definition and interface definition including exactly what systems or parts of systems will make up the project, what interconnections the project entails, or what information needs to flow across the system interconnections. Requirement definition may go through similar levels of detail, starting with very high-level description of project functions and moving toward system specifications. By identifying the portions of the Statewide ITS Architecture that define the project, the architecture outputs can be used to create aspects of the project definition.

The areas that an ITS architecture can assist in project definition are:

- The identification of agency roles and responsibilities (including any interagency cooperation) can come from the operational concept developed as part of the ITS architecture. This operational concept can either serve as a starting point for a more detailed definition, or possibly provide all the needed information.
- Requirements definition can be completely or partly defined by using the ITS architecture functional requirements applicable to the project.
- The ITS architecture includes a map to ITS standards, and the project mapping to the Statewide ITS Architecture can extract the applicable ITS standards for the project.

RFP Generation
Once a project is defined, and funding is committed, the implementation process can commence with the generation of a RFP, which is the common governmental practice for initiating a

contract with the private sector to implement the project. Once a contract is in place, project implementation begins and moves through design, development, integration, and testing.

The Statewide ITS Architecture, and the products produced during its development, can support this RFP generation. First, the project definition described above forms the basis for what is being procured. Mapping the project to the Statewide ITS Architecture allows bidders to have a clear understanding of the scope of the project and of the interfaces that need to be developed. The functional requirements created as part of the Statewide ITS Architecture can be used to describe the functional requirements for the project. In addition, a subset of the ITS Standards identified as part of the Statewide ITS Architecture development can be specified in the RFP.

Project Implementation

Because ITS projects involve systems and their interconnections, it is very important to follow a systems engineering approach to designing and implementing the project. While the exact process followed is at the discretion of the local agency, the FHWA and FTA ITS Architecture and Standards Final Rule/Policy lay out a set of required systems engineering analyses for ITS projects funded through the highway trust fund. The required systems engineering analysis steps are:

- Identification of portions of the ITS architecture being implemented;
- Identification of participating agencies' roles and responsibilities;
- Requirements definitions;
- Analysis of alternative system configurations and technology options to meet requirements;
- Procurement options;
- Identification of applicable ITS standards and testing procedures; and
- Procedures and resources necessary for operations and management of the system.

The ITS architecture can provide inputs to a number of these steps as shown in Table 11-1.

Table 11-1. Systems Engineering Requirements Supported by ITS Architecture

Systems Engineering Requirements	ITS Architecture Output
Identification of portions of the ITS architecture being implemented	Mapping the project to the elements and interfaces of the ITS architecture.
Identification of participating agencies' roles and responsibilities	Using Operational Concept as a starting point.
Requirements definitions	Using Functional Requirements as a starting point.
Identification of applicable ITS standards and testing procedures	Using architecture standards outputs as a starting point for the standards definition.

11.2 Integration Strategy

The overall objective of an ITS architecture is to support the effective and efficient deployment of ITS projects that address the transportation problems and needs of the region. The ITS architecture focuses on the integration of systems to gain the maximum benefit of each system's information and capabilities across the transportation network. The integration strategy provides the process connection between the ITS projects that are deployed within the regions and throughout Mississippi at the statewide level. The ITS architecture defines "what" needs to be put in place to address the needs and requirements of the region. The transportation planning process can leverage the ITS architecture as a roadmap to project sequencing and interdependency to achieve an integrated transportation system that addresses those strategic objectives.

The most challenging issue in the integration of the ITS architecture into the planning process is the fact that there is more than one planning process. Coordination is important between MDOT and the various MPOs and Planning and Development Districts throughout the state for ITS projects in their respective plans. Integration opportunities can be taken advantage of within each of these regions as well as between them. This is the primary intent of the ITS architecture compliance where Federal funding is involved.

Another difficult issue to address is coordination of ITS project planning between the federally funded projects and non-federally funded projects. Generally, non-federally funded projects are not part of the Long Range Planning Process or the Transportation Improvement Program. The ITS Architecture can provide a bridge between federally and non-federally funded projects and systems. Coordinating all of these projects requires an understanding by all existing and potential ITS stakeholders within the entire region. The Statewide ITS Architecture provides a common reference point for all stakeholders to gain insight into the integration of various ITS systems.

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12. ARCHITECTURE MAINTENANCE PLAN

12.1 Introduction

The Mississippi Statewide ITS Architecture has been created as a consensus view of what ITS systems the stakeholders within Mississippi have implemented and what systems they plan to implement in the future. By its nature, the architecture is not a static set of outputs. The architecture should be modified as plans and priorities change, ITS projects are implemented, and the ITS needs and services evolve in the state. There are many actions that may cause a need to update the architecture, including:

- **Changes in Project Definition.** When actually defined, a project may add, subtract or modify elements, interfaces, or information flows of the Statewide ITS Architecture. Because the architecture is meant to describe not only ITS planned, but also the current ITS implementations, it should be updated to correctly reflect the deployed projects.

- **Changes due to Project Addition/Deletion.** Occasionally a project will be added, deleted or modified during the planning process. When this occurs, the aspects of the Statewide ITS Architecture associated with the project should be added, deleted or modified.

- **Changes in Project Status.** As projects are deployed, the status of the architecture elements, services and flows that are part of the projects will have to be changed from planned to existing. Elements, services and flows should be considered to exist when they are substantially complete.

- **Changes in Project Priority.** Due to funding constraints, technological changes or other considerations, a project planned may be delayed or accelerated. Such changes should be reflected in the Statewide ITS Architecture.

- **Changes in Statewide/Regional Needs.** Transportation planning is done to address both statewide and regional transportation needs. Over time these needs change and the corresponding aspects of the Statewide ITS Architecture that addresses these needs should be updated.

- **Changes in Participating Stakeholders.** Stakeholder involvement can also change over time. The Statewide ITS Architecture should be updated to reflect the participating stakeholder roles in the statewide view of ITS elements, interfaces, and information flows.

- **Changes in Other Architectures.** The Statewide ITS Architectures includes not only elements and interfaces within the State of Mississippi or within an MPOs own region, but also interfaces to elements in adjoining regions or states. Changes in the ITS Architecture in adjoining regions or states may necessitate changes in the Mississippi Statewide ITS Architectures to maintain consistency. A Regional ITS Architecture may

overlap with the Statewide ITS Architecture and a change in one architecture may necessitate a change in the other.

- **Changes in National ITS Architecture.** The National ITS Architecture may be expanded and evolved from time to time to include new user services or refine existing services. These changes should be considered as the Statewide ITS Architecture is updated.

The following sections define the key aspects of the process for the maintenance of the Mississippi Statewide ITS Architecture:

- Who is responsible for architecture maintenance?
- What will be maintained?
- How will it be maintained (i.e. what configuration control process will be used?)?

12.2 Who Is Responsible for Architecture Maintenance?

Responsibility for maintaining the Statewide ITS Architecture will lie with MDOT. MDOT will create a Statewide ITS Steering Committee that oversees all ITS activities in Mississippi, including policy, planning, architecture, design, implementation, operations, and maintenance, etc. The Statewide ITS Steering Committee will assign an ITS Technical Subcommittee for the maintenance of the Statewide ITS Architecture. This Technical Subcommittee will be responsible for reviewing proposed changes, providing recommendations to the Statewide ITS Steering Committee for review and approval, making approved changes to the Architecture, and reviewing the results of the changes. The Technical Subcommittee will meet on an annual basis, or more frequently as necessary, to review any proposed changes to the Architecture.

The Statewide ITS Steering Committee will consist of the following agency representatives:

- MDOT State Traffic Engineer
- MDOT Planning Engineer
- MDOT ITS Manager
- Central Mississippi Planning & Development District Director
- Gulf Coast Planning Commission Director
- Northwest Mississippi (Desoto County) Representative
- Mississippi Department of Public Safety (Highway Patrol)
- City of Jackson

The Chair of the Technical Subcommittee will serve as the Maintenance Manager responsible for overseeing and guiding the maintenance effort. The Maintenance Manager should coordinate the activities of the architecture maintenance, including calling the meetings, making arrangements, assembling an agenda, leading the meetings, and approving minutes.

12.3 What Will Be Maintained?

There are several different components that make up the Mississippi Statewide ITS Architecture. Some may require more frequent updates than others, but the entire architecture will need periodic review to ensure that it is consistent with statewide and regional goals. This version of the Mississippi Statewide ITS Architecture shall be the baseline architecture upon which future revisions are conducted as necessary. The maintenance timeframe identified in this document will become effective upon completion of this Mississippi Statewide ITS Architecture.

The Mississippi Statewide ITS Architecture was updated using Turbo Architecture Software Version 3.1 and stored in an electronic Turbo Architecture database. The architecture is represented through a set of outputs including various reports and diagrams. Collectively these outputs can be used to develop a general ITS architecture document. The architecture will be maintained through updates in the electronic database using Turbo Architecture.

The following may be reviewed and updated at regular intervals:

- Description of the region
- Participating agencies and other stakeholders, including key contact information
- Inventory of existing and planned ITS systems in the region
- Operational concept that identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems
- Agreements for operations and interoperability
- System functional requirements
- Interface requirements and information exchanges with planned and existing systems and subsystems
- Applicable ITS standards supporting regional and national interoperability
- Sequence of projects for implementation

Outputs such as interconnect and architecture flow diagrams, inventory lists, stakeholders lists and other diagrams and reports can be produced from the Turbo Architecture software, so they are by-products of the architecture database. These outputs can be updated as necessary for meetings or outreach activities.

To aid the architecture version document control, it is recommended that the filename of the database should contain the version number and/or date on which the architecture was updated. Also, the version number and date should be included in the Turbo Architecture database.

12.4 What Configuration Control Will be Used?

Once the architecture baseline is defined, the process for making changes to this baseline must be established. The configuration control (change management) process specifies how changes are identified, how often changes are be made, and how the changes will be reviewed, implemented, and released.

How Changes are identified

Changes to the Mississippi Statewide ITS Architecture may be identified by two channels. One is that MDOT proposes changes to the architecture according to the ITS projects or projects with ITS components within the region. Another channel is that any stakeholders identified as a participant in the Statewide ITS Architecture may propose potential changes. If the proposed change is to add a new stakeholder and the stakeholder's ITS elements and interfaces, that agency should submit the change request. All change requests should be sent to the Maintenance Manager.

Stakeholders should use the Change Request Form to propose changes. A Change Request form is shown on page 141. The changes to the architecture, the reasons for the proposed modifications and the stakeholder contact should be clearly defined in the request. Upon receiving a Change Request form, the Maintenance Manager will perform an initial assessment of the proposed change for the impact to the Statewide ITS Architecture and/or the affected document. If the propose change has an impact on other stakeholders, the Maintenance Manager should contact the stakeholders to confirm their agreement with the proposed modification.

How often Changes are made

A comprehensive, formal update of the Mississippi Statewide ITS Architecture Baseline should be performed annually. This maintenance schedule will ensure that the architecture continues to accurately represent statewide and regional goals. Minor or informal modifications may be made at the discretion of the Maintenance Manager, given the modifications are approved by the Technical Subcommittee.

Change Review, Implementation, and Release

The general steps in the process of change review, implementation and release are:

1. Stakeholders define and propose changes per the recommendations given above.
2. The Technical Subcommittee and the Maintenance Manager, as necessary in coordination with the stakeholders affected by the proposed changes, evaluate the changes and determine what impact they may have on the Architecture and/or associated documentation.
3. The Technical Subcommittee reviews the proposed changes, offers comments, and/or asks for additional information.
4. Upon its review, the Technical Subcommittee makes recommendations on the requested changes to the Statewide ITS Steering Committee for approval.
5. The Statewide ITS Steering Committee makes decisions to either accept the change, reject it, or ask for additional evaluation.
6. The Technical Subommittee and the Maintenance Manager implement the decisions. If the decision is to accept the change, then the appropriate portions of the architecture baseline are updated (per the schedule discussed above) and an updated architecture baseline is defined.
7. Once the Statewide ITS Architecture has been modified, the stakeholders should be notified by the Maintenance Manager of architecture updates and informed on how to obtain the latest version of the Architecture.

The time required to perform this configuration control process will be a direct function of the number of changes suggested to the Architecture, which will be driven by how much the Architecture is being used. It is suggested that this process be reviewed periodically and fine-tuned to most appropriately address the level of change that has occurred.

Mississippi Statewide ITS Architecture Change Request Form

Originator Name:		Date Submitted:
Originator Agency:		
Originator Telephone:	Originator Fax:	Originator E-Mail:
Agency Authorized Signature:		Signature Date:

Description of Proposed Change:		
Rationale for Proposed Change:		
Impacted Agency:	Authorized Signature:	Signature Date:
Impacted Agency:	Authorized Signature:	Signature Date:

Impacted Agency:	Authorized Signature:	Signature Date:
List of Attachments:		
Baseline Document(s) Impacted: ☐ Turbo Architecture ☐ Architecture Report ☐ Other (describe)		

To Be Completed By Maintenance Manager		
Change Request No.:	Date Received:	Date Logged:
Date Initially Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Comments:
Data Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Comments:
Data Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Comments:
Date of Committee Approval (If Applicable):		
Baseline Documents Impacted/Version Implemented:		

☐ Turbo Architecture	Date: _____	Version: _____
☐ Architecture Report	Date: _____	Version: _____
☐_____	Date: _____	Version: _____

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Appendix A: Stakeholder Survey Questionnaire

Before completing this survey, please provide the following information:

Name: _____

Title: _____

Agency: _____

Division: _____

Phone: _____

Fax: _____

E-mail: _____

QUESTIONNAIRE

The questionnaire is organized by the following sections:

General Questions
User Needs and Services
Data Management and Archiving
Roadway Operations – including freeway and arterial management and operations
Roadway Maintenance – including general roadway maintenance, winter maintenance, and work zone activities
Transportation Security
Incident & Emergency Management
Transit Operations
Commercial Vehicle Operations

Instructions

You are not required to fill out the entire survey questionnaire. To save your time, a matrix shown below is developed to instruct which sections of the questionnaire you should complete. Please fill out the sections of the questionnaire that are applicable to you. You are certainly welcome to fill out other sections and provide additional information. Feel free to skip any questions that you do not

Type of Agency	Section								
	A	B	C	D	E	F	G	H	I
Transportation Operations and Maintenance Agency (District Office, Project Office, Maintenance Office, Traffic and Safety Office, Public Works Department, Engineers Office, etc.)	X	X	X	X	X	X			
Roadway Service Patrol	X	X	X			X	X		
DOT Office of Enforcement, Law Enforcement and Emergency Management Agency (Sheriff Department, Police Department, Fire Department, Emergency Management Agency, Emergency Medical Services, etc.)	X	X	X			X	X		X
Planning	X	X	X	X	X	X	X	X	X
Public Transportation Agency	X	X	X					X	
Data Archives/Data Management Agency	X	X	X						
Others	X	X	X						

A. General Questions

1. Are your agency planning any ITS projects, including but not limited to traffic management centers, dispatch centers, transit vehicles, communications infrastructure, etc.

   ☐ YES ☐ NO

   If YES, please describe the project(s) and/or provide project name(s) and available documentation source(s).

   _____

   _____

   _____

   _____

   _____

   _____

2. Does your agency exchange voice or data information (including by telephone or fax) with any of the following types of organizations/agencies? Please select all that apply and list the appropriate organizations/agencies by name.

☐ Incident/Emergency_____

_____

_____

☐ Freeway_____

_____

_____

☐ Arterial or Non-Freeway _____

_____

_____

☐ Maintenance and Construction_____

_____

_____

☐ Public Transportation_____

_____

_____

☐ Commercial Vehicle Operations/Inspection_____

_____

_____

3. What specific types of information do you share with these organizations/agencies?

Incident/Emergency_____

_____

_____

_____

Freeway_____

_____

_____

_____

Arterial or Non-Freeway _____

_____

_____

_____

Maintenance and Construction_____

_____

_____

_____

Public Transportation_____

_____

_____

_____

Commercial Vehicle Operations/Inspection_____

_____

_____

_____

4. Please indicate what communications technologies are available within your agency that might be used to exchange information with other agencies?

- Center-to-Center Communications ☐ EXISTING ☐ PLANNED
- Internet System Access and Browsing ☐ EXISTING ☐ PLANNED
- Agency Radio Network ☐ EXISTING ☐ PLANNED
- Telephone ☐ EXISTING ☐ PLANNED
- Fax ☐ EXISTING ☐ PLANNED
- Pager ☐ EXISTING ☐ PLANNED
- E-mail ☐ EXISTING ☐ PLANNED
- Scheduled Mailings ☐ EXISTING ☐ PLANNED
- Other_____

5. What existing communicating infrastructure (for transportation or other uses) is controlled/owned by your organization or agency?

- Radio ☐ EXISTING ☐ PLANNED
- Copper Cable ☐ EXISTING ☐ PLANNED
- Fiber Cable ☐ EXISTING ☐ PLANNED
- Wireless ☐ EXISTING ☐ PLANNED
- Other_____

6. Does your agency disseminate (or plan to disseminate) traffic or weather condition information to the public in any of the following ways?

- Dynamic Message Signs (DMS) (permanent or portable) ☐ EXISTING ☐ PLANNED
- Highway Advisory Radio (HAR) ☐ EXISTING ☐ PLANNED
- In-Vehicle Navigation Systems ☐ EXISTING ☐ PLANNED
- TV/Radio ☐ EXISTING ☐ PLANNED
- Internet ☐ EXISTING ☐ PLANNED
- Kiosks ☐ EXISTING ☐ PLANNED
- E-mail ☐ EXISTING ☐ PLANNED
- 511 or Other Telephone Services ☐ EXISTING ☐ PLANNED
- Pager or Personal Data Assistants (PDAs) ☐ EXISTING ☐ PLANNED
- DMS controlling parking access ☐ EXISTING ☐ PLANNED

- Other_____

7. Does your agency receive (or plan to receive) information from the National Weather Service?

   ☐ EXISTING ☐ PLANNED ☐ NO

8. Does your agency receive (or plan to receive) surface transportation specific weather information from a value-added sector specific meteorological service provider?

   ☐ EXISTING ☐ PLANNED ☐ NO

9. Does your agency have (or plan to have) the capability to provide any of the following information?

   a. Broadcast of Static or Real-Time Traffic, Transit, or Maintenance and Construction Information? ☐ EXISTING ☐ PLANNED ☐ NO

   b. Personalized provision of Traffic, Transit, or Maintenance and Construction Information to users? ☐ EXISTING ☐ PLANNED ☐ NO

   c. Route Guidance (either pre-trip or enroute)? ☐ EXISTING ☐ PLANNED ☐ NO

   d. Yellow Pages Information or Reservation? ☐ EXISTING ☐ PLANNED ☐ NO

10. Please list any current agreements or memoranda of understanding that your agency has in place with any other organizations/agencies (e.g., maintenance of traffic signals, media agreements).

    _____

    _____

    _____

    _____

    _____

Additional Information / Comments

_____

_____

_____

B. User Needs and Services

1. What are the major transportation problems and issues in your jurisdictional area?

_____

_____

_____

_____

_____

_____

2. Please identify and rank the top 10 user needs and services (across all service areas) for mitigating critical transportation problems and issues in your jurisdiction. Use the numbers from 1 to 10 with 1 being the most critical user needs and services.

Travel and Traffic Management

___ Pre-trip Travel Information
___ En-route Driver Information
___ Route Guidance
___ Ride Matching and Reservation
___ Traveler Services Information
___ Traffic Control
___ Incident Management
___ Travel Demand Management
___ Emissions Testing and Mitigation
___ Highway Rail Intersection

Public Transportation Management

___ Public Transportation Management
___ En-route Transit Information
___ Personalized Public Transit
___ Public Travel Security

Electronic Payment

___ Electronic Payment Services

Commercial Vehicle Operations

___ Commercial Vehicle Electronic Clearance
___ Automated Roadside Safety Inspection
___ On-board Safety and Security Monitoring
___ Commercial Vehicle Administrative Processes
___ Hazardous Materials Security and Incident Response
___ Freight Mobility

Emergency Management

___ Emergency Notification and Personal Security
___ Emergency Vehicle Management
___ Disaster Response and Evacuation

Advanced Vehicle Safety Systems

___ Longitudinal Collision Avoidance
___ Lateral Collision Avoidance
___ Intersection Collision Avoidance
___ Vision Enhancement for Crash Avoidance
___ Safety Readiness
___ Pre-crash Restraint Deployment
___ Automated Vehicle Operation

Information Management

___ Archived Data

Maintenance and Construction Management

___ Maintenance and Construction Operations

3. Based on your understanding of ITS technology in transportation, what opportunities do you see in the future for the application of ITS technologies in your area? (Please check all applied)

☐ CCTV Surveillance
☐ Integrated Statewide Emergency Response
☐ Coordinated Signal Systems
☐ Integrated Regional Incident Management
☐ Advanced Highway/Rail Grade Crossing Control
☐ Variable/Dynamic Message Signs
☐ Pre-planned Detour/Evacuation Routes
☐ Highway Advisory Radio (HAR)
☐ Transit/Parking Smart Card Payment System
☐ Traffic Signal Priority for transit vehicles
☐ Traffic Signal Priority for emergency vehicles
☐ Internet Traveler Information Website
☐ Telephone Traveler Information
☐ Aerial Detection
☐ Road Weather Systems
☐ Advanced Work Zone Management
☐ AVL/In-vehicle Navigation System for Emergency or Maintenance Vehicles
☐ Transit Location/ Information System
☐ Cell number for incident detection (e.g. *999)
☐ Cable TV Traveler Information

☐ Highway Service Patrol

☐ Hazardous Materials Response

Others:

_____

_____

Additional Information / Comments

_____

_____

_____

_____

_____

C. Data Management and Archiving

1. Does your agency collect and store (or plan to collect and store) data (data archiving)?

☐ YES ☐ NO

If YES, please select all that apply and list the appropriate data types (traffic volume, speed, incident, condition assessment, video, ridership, etc.), data sources (organizations/agencies, systems, equipment, etc.) and data formats (electronic database, paper files, etc.)

- Traffic Data ☐ EXISTING ☐ PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Emergency/Accident Data ☐ EXISTING ☐ PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Maintenance and Construction Data ☐ EXISTING ☐ PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Public Transportation Data ☐ EXISTING ☐ PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Commercial Vehicle Data ☐ EXISTING ☐ PLANNED

Data Types: _____ _____

Data Sources: _____

Data Formats: _____

- Emission Data ☐ EXISTING ☐ PLANNED

Data Types: _____ _____

Data Sources: _____

Data Formats: _____

- Parking Data ☐ EXISTING ☐ PLANNED

Data Types: _____

Data Sources: _____

Data Formats: _____

- Other_____

_____

_____

_____

2. Does your archived data management system provide general query and report functionality?

☐ EXISTING ☐ PLANNED ☐ NO

3. Does your archived data management system provide advanced features such as data analysis, summarization, and data mining to facilitate discovery of information, patterns, and correlations in large data sets?

☐ EXISTING ☐ PLANNED ☐ NO

4. Does your organization or agency use Geographic Information Systems (GIS)?

☐ EXISTING ☐ PLANNED ☐ NO

If EXISTING or PLANNED, what types of information are GIS used for?

_____

_____

_____

Additional Information / Comments

_____

_____

_____

_____

_____

_____

D. Roadway Operations

1. Does your agency use (or plan to use) any of the following real-time traffic data collection technologies?

   - Loop Detectors that provide volume and speed data at midblock locations (this **excludes** actuators on intersection approaches)
     ☐ EXISTING ☐ PLANNED
   - CCTV Cameras ☐ EXISTING ☐ PLANNED
   - Vehicle Probe Readers to estimate travel times on arterials
     ☐ EXISTING ☐ PLANNED
   - Road Weather Information System ☐ EXISTING ☐ PLANNED
   - Overheight Vehicle Detection ☐ EXISTING ☐ PLANNED
   - Other_____

     _____

     _____

     _____

2. Does your agency detect and verify (or plan to detect and verify) traffic incidents using sensors and surveillance equipment?

   ☐ EXISTING ☐ PLANNED ☐ NO

3. Does your agency operate (or plan to add) lane control devices (e.g., changeable overhead directional arrows)?

☐ EXISTING ☐ PLANNED ☐ NO

4. Does your agency manage (or plan to manage) automatic or remotely controlled gates or barriers that control access to roadway segments including ramps and traffic lanes?

☐ EXISTING ☐ PLANNED ☐ NO

5. Does your agency operate (or plan to add) ramp meters on freeway entrances?

☐ YES ☐ NO

If YES, please indicate what is (or will be) used:

- Pre-emption for emergency vehicles ☐ EXISTING ☐ PLANNED
- Priority for transit vehicles ☐ EXISTING ☐ PLANNED

6. Does your agency control (or plan to control) any signalized intersections?

☐ YES ☐ NO

If NO, skip to Section E.
If YES, do any of your signalized intersections have (or plan to have):

- Closed Loop or Centralized Control ☐ EXISTING ☐ PLANNED
- Real-Time traffic adaptive control such as SCOOT/SCATS or similar ☐ EXISTING ☐ PLANNED
- Signal Preemption for emergency vehicles ☐ EXISTING ☐ PLANNED
- Signal Priority for Transit Vehicles ☐ EXISTING ☐ PLANNED
- Wireless Communications ☐ EXISTING ☐ PLANNED
- Other_____

_____

7. Does your agency have (or plan to have) any signalized intersections that are interconnected with active railroad crossing devices?

☐ EXISTING ☐ PLANNED ☐ NO

8. Does your agency monitor highway-rail intersections with any of the following technologies?

- Vehicle Detectors ☐ EXISTING ☐ PLANNED
- Video Surveillance/Detection ☐ EXISTING ☐ PLANNED
- Train Arrival Prediction (Predict Train Arrival Electronically) ☐ EXISTING ☐ PLANNED
- Electronic Traffic Violator Devices ☐ EXISTING ☐ PLANNED
- Other_____

_____

Additional Information / Comments

_____

_____

_____

E. Roadway Maintenance

1. Does your agency provide or support (or plan to provide or support) on-going operations and maintenance activities?

☐ EXISTING ☐ PLANNED ☐ NO

2. Does your agency have (or plan to have) a maintenance and construction vehicle fleet?

☐ EXISTING ☐ PLANNED ☐ NO

If NO, skip to question #7.

3. Does your agency operate or maintain (or plan to operate or maintain) a dispatch facility?

☐ EXISTING ☐ PLANNED ☐ NO

If EXISTING or PLANNED, how do your dispatchers communicate with the vehicle operators?

_____

_____

_____

4. Does your agency use (or plan to use) an Automated Vehicle Location (AVL) system?

   ☐ EXISTING ☐ PLANNED ☐ NO

5. Does your agency provide (or plan to provide) maintenance of the vehicles in your fleet?

   ☐ EXISTING ☐ PLANNED ☐ NO

6. Does your agency have (or plan to have) the capability to automate vehicle maintenance scheduling and manage both routine and corrective maintenance activities on vehicles?

   ☐ EXISTING ☐ PLANNED ☐ NO

7. Does your agency collect (or plan to collect) road and weather conditions data from environmental sensors located on or near the roadway?

   ☐ EXISTING ☐ PLANNED ☐ NO

8. Does your agency use (or plan to use) environmental data or information to detect environmental hazards such as icy road conditions, high winds, or dense fog?

   ☐ EXISTING ☐ PLANNED ☐ NO

9. Does your agency have (or plan to have) any roadway deicing systems?

   ☐ EXISTING ☐ PLANNED ☐ NO

10. Does your agency provide (or plan to provide) maintenance services such as landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), or repair and maintenance of equipment (both ITS and non-ITS) on the roadway?

    ☐ EXISTING ☐ PLANNED ☐ NO

11. Does your agency perform (or plan to perform) winter maintenance activities?

    ☐ EXISTING ☐ PLANNED ☐ NO

12. Does your agency manage roadway work zone activities?

    ☐ YES ☐ NO

    If YES, please identify below the devices or systems currently deployed or planned for work zone monitoring.

    - Dynamic Message Signs (DMS) ☐ EXISTING ☐ PLANNED
    - Closed Circuit Television (CCTV) ☐ EXISTING ☐ PLANNED

- Vehicle Speed Monitoring using Remote Devices (i.e. Sensors/Detectors)

  ☐ EXISTING ☐ PLANNED

- Work Zone Intrusions (Detection system on/near the roadway or on-board of maintenance vehicles) ☐ EXISTING ☐ PLANNED
- Other _____

Additional Information / Comments

_____

_____

_____

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_____

_____

_____

F. Transportation Security

1. Does your agency monitor (or plan to monitor) the transportation infrastructure (e.g., bridges, tunnels, and management centers) for potential threats using sensors and surveillance equipment?

   ☐ EXISTING ☐ PLANNED ☐ NO

2. Does your agency remotely control (or plan to remotely control) barrier and safeguard systems to preclude an incident, control access during and after an incident or mitigate the impact of an incident?

   ☐ EXISTING ☐ PLANNED ☐ NO

3. Does your agency monitor (or plan to monitor) public travel-related areas such as transit stations, transit stops, rest stops, and kiosk locations for potential threats using sensors and surveillance equipment?

   ☐ EXISTING ☐ PLANNED ☐ NO

4. Does your agency use (or plan to use) ITS devices and traveler information systems (such as dynamic message signs, highway advisory radio, 511 or other telephone services, TV/radios, Internet, e-mail, and kiosks) to alert the public in emergency situations such as

child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property?

☐ EXISTING ☐ PLANNED ☐ NO

5. Does your agency use (or plan to use) sensors and surveillance equipment to monitor and detect potential, looming, and actual disasters including natural disasters and technological and man-made disasters (hazardous materials incidents, nuclear, chemical, biological, and radiological attacks) and notify all responding agencies of detected emergencies?

   ☐ EXISTING ☐ PLANNED ☐ NO

6. Does your agency support (or plan to support) disaster response and recovery, including coordination of emergency response plans and resources, damage assessment, service restoration, and transition back to normal operation?

   ☐ EXISTING ☐ PLANNED ☐ NO

7. Does your agency support (or plan to support) evacuation of the general public from a disaster area and manage subsequent reentry to the disaster area using transportation resources?

   ☐ EXISTING ☐ PLANNED ☐ NO

8. Does your agency provide (or plan to provide) disaster-related traveler information to the general public, regarding evacuation and reentry information and other information concerning the operation and availability of the transportation system during a disaster?

   ☐ EXISTING ☐ PLANNED ☐ NO

Additional Information / Comments

_____

_____

_____

_____

_____

_____

_____

G. Incident/Emergency Management

1. Does your agency currently perform (or plan to perform) Computer Aided Dispatch (CAD) of emergency vehicles?

   ☐ EXISTING ☐ PLANNED ☐ NO

2. Does your agency use (or plan to use) an Automated Vehicle Location (AVL) system?

   ☐ EXISTING ☐ PLANNED ☐ NO

3. Does your agency receive (or plan to receive) incident data from an arterial, freeway, transit, or other emergency management agencies?

Arterial Management:	☐ EXISTING	☐ PLANNED	☐ NO
Freeway Management:	☐ EXISTING	☐ PLANNED	☐ NO
Maintenance and Construction:	☐ EXISTING	☐ PLANNED	☐ NO
Transit Agency(ies):	☐ EXISTING	☐ PLANNED	☐ NO
Other Emergency Management:	☐ EXISTING	☐ PLANNED	☐ NO

   Other _____

4. Does your agency send (or plan to send) incident data to an arterial, freeway, transit, or other emergency management agencies?

Arterial Management:	☐ EXISTING	☐ PLANNED	☐ NO
Freeway Management:	☐ EXISTING	☐ PLANNED	☐ NO
Maintenance and Construction:	☐ EXISTING	☐ PLANNED	☐ NO
Transit Agency(ies):	☐ EXISTING	☐ PLANNED	☐ NO
Other Emergency Management:	☐ EXISTING	☐ PLANNED	☐ NO

   Other _____

5. Does your agency have (or plan to have) preemption lights for signalized intersections or ramp meters?

   ☐ EXISTING ☐ PLANNED ☐ NO

6. Does your agency receive (or plan to receive) real-time traffic information and conditions from transportation agencies to support and enhance emergency vehicle routing?

   ☐ EXISTING ☐ PLANNED ☐ NO

If EXISTING or PLANNED, from which agency(ies):

_____

_____

_____

_____

_____

Additional Information / Comments

_____

_____

_____

_____

_____

_____

_____

H. Transit Operations

1. What types of transit services does your agency operate (or plan to operate)?

- Fixed Route ☐ EXISTING ☐ PLANNED
- Demand Responsive (Paratransit) ☐ EXISTING ☐ PLANNED
- Rail ☐ EXISTING ☐ PLANNED
- Ferries ☐ EXISTING ☐ PLANNED
- Other _____

2. Does your agency provide (or plan to provide) maintenance of the transit vehicles?

☐ EXISTING ☐ PLANNED ☐ NO

3. Does your agency have (or plan to have) the capability to automate vehicle maintenance scheduling and manage both routine and corrective maintenance activities on vehicles?

☐ EXISTING ☐ PLANNED ☐ NO

4. Does your agency use (or plan to use) an Automated Vehicle Location (AVL) system?

☐ EXISTING ☐ PLANNED ☐ NO

5. Does your agency have (or plan to have) security monitoring systems on-board transit vehicles?

   ☐ EXISTING ☐ PLANNED ☐ NO

6. Does your agency monitor (or plan to monitor) public areas (e.g. stops, park & ride lots, stations) using sensors and surveillance equipment?

   ☐ EXISTING ☐ PLANNED ☐ NO

7. Does your agency use sensors and surveillance equipment to perform security monitoring (or plan to monitor) non-public areas (e.g. transit yards or other infrastructure)?

   ☐ EXISTING ☐ PLANNED ☐ NO

8. Does your agency directly or indirectly (i.e., thru another agency/) provide (or plan to provide) transit information to the public?

   ☐ YES ☐ NO

   If YES, please identify below the method(s) currently used or planned for provide transit information:

   - Internet Web Page ☐ EXISTING ☐ PLANNED
   - Pagers or Personal Data Assistants ☐ EXISTING ☐ PLANNED
   - Kiosks ☐ EXISTING ☐ PLANNED
   - Display/Audio in Transit Vehicles ☐ EXISTING ☐ PLANNED
   - E-mail or other direct PC communications ☐ EXISTING ☐ PLANNED
   - Electronic Displays/Audio Announcements at Transit Stops and Stations (includes video monitors) ☐ EXISTING ☐ PLANNED
   - TV (interactive or dedicated Cable) ☐ EXISTING ☐ PLANNED
   - Other _____

9. Does your agency provide (or plan to provide) real-time transit information (i.e., latest available information on transit routes, schedules, transfer options, bicycle accessibility, fares, real-time schedule adherence, etc.) at stops or parking facilities?

   ☐ EXISTING ☐ PLANNED ☐ NO

10. Does your agency provide transit trip planning?

    ☐ YES ☐ NO

If YES, please identify below the method(s) currently used or planned for provide the trip planning information:

- Internet ☐ EXISTING ☐ PLANNED
- E-mail or other direct PC communications ☐ EXISTING ☐ PLANNED
- Kiosks ☐ EXISTING ☐ PLANNED
- Other _____

11. Does your agency have (or plan to have) an Electronic Fare Payment System (smart card, swipe card, credit card, etc.)?

☐ EXISTING ☐ PLANNED ☐ NO

12. Does your transit vehicles have (or plan to have) the capability to receive priority lights at signalized intersections?

☐ EXISTING ☐ PLANNED ☐ NO

Additional Information / Comments

_____

_____

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_____

I. Commercial Vehicle Operations

1. Does your agency perform (or plan to perform) electronic credential administrative services for commercial vehicles?

☐ EXISTING ☐ PLANNED ☐ NO

2. Does your agency participate (or plan to participate) in roadside commercial vehicle inspection?

☐ EXISTING ☐ PLANNED ☐ NO

If NO, no further responses are required in this section.

3. Does your agency perform (or plan to perform) electronic screening?

☐ EXISTING ☐ PLANNED ☐ NO

4. Does your agency exchange (or plan to exchange) safety and/or security information?

   ☐ EXISTING ☐ PLANNED ☐ NO

5. Does your agency perform (or plan to perform) a high speed weigh-in-motion service?

   ☐ EXISTING ☐ PLANNED ☐ NO

6. Does your agency participate (or plan to participate) in HAZMAT detection?

   ☐ EXISTING ☐ PLANNED ☐ NO

   If EXISTING or PLANNED, please list any handheld or roadside equipment for detection and classification of security sensitive HAZMAT on commercial vehicles, and for accessing credentials information on driver verification.

   _____

   _____

Additional Information / Comments

_____

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Appendix B: Functional Requirements

Functional Requirements

Mississippi Statewide ITS Architecture (Region)

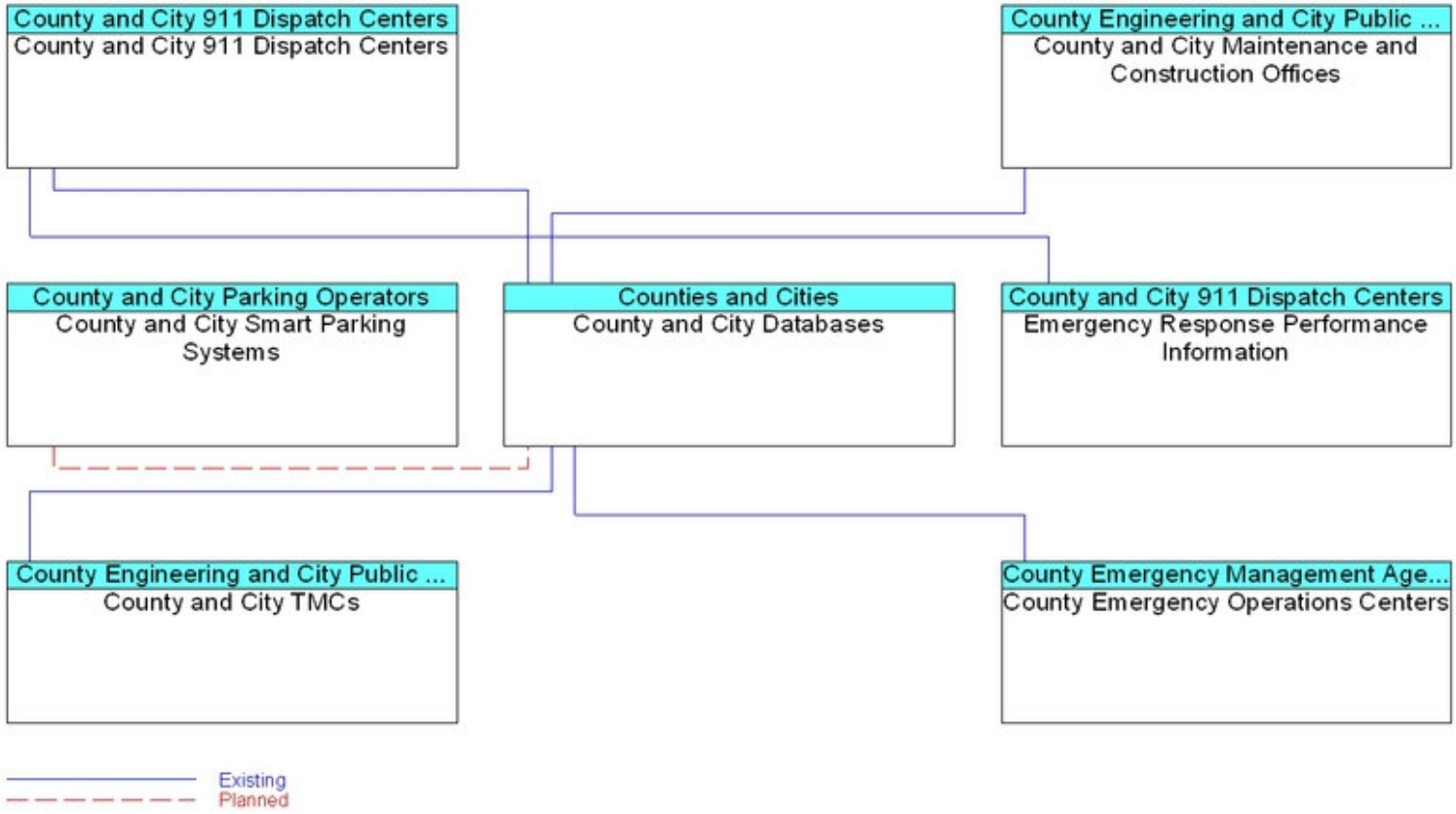
10/31/2008 9:52:40AM

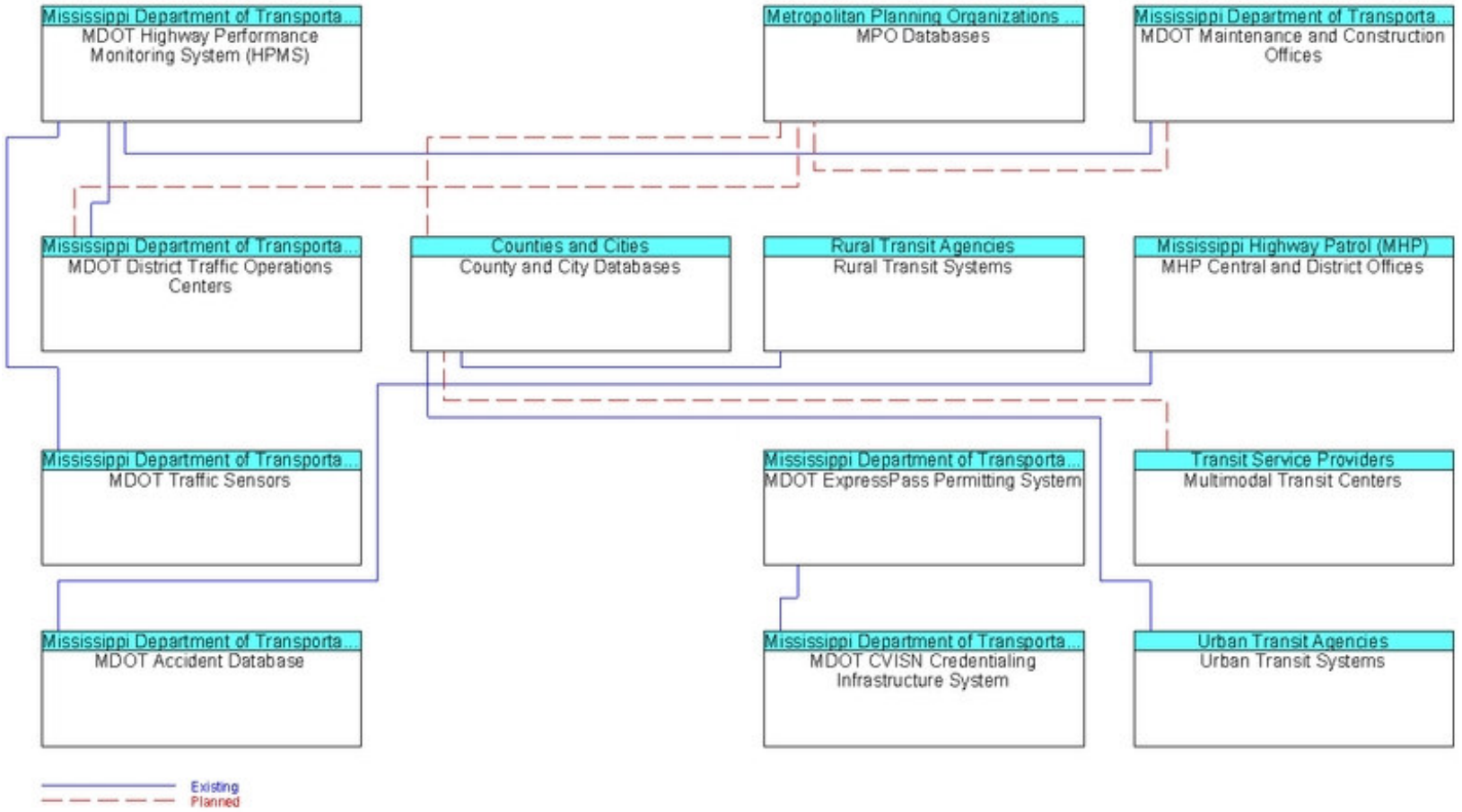
Architecture		Status
Mississippi Statewide ITS Architecture (Region)		(Region)
Element: **Airport Parkway Toll Center**		
Entity: **Toll Collection**		
Functional Area: **Toll Plaza Toll Collection** Roadside collection of tolls from vehicle toll tags and violation identification.		
Requirement:	1 The field element shall read data from vehicle toll tags to support toll payment transactions.	Planned
Requirement:	3 The field element shall update the toll tag value after debiting the toll amount and send a record of the transaction to a center.	Planned
Requirement:	4 The field element shall read the credit identity on the toll tag and send that identity and the amount to be debited to a center.	Planned
Requirement:	7 The field element shall control roadside displays indicating success or failure of the toll transaction to the driver.	Planned
Requirement:	10 The field element shall forward wide-area alert information to the Toll Operator.	Planned
Element: **Airport Parkway Toll Operations**		
Entity: **Toll Administration**		
Functional Area: **Toll Administration** Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.		
Requirement:	1 The center shall manage toll transactions, including maintaining a log of all transactions and toll pricing structure information.	Planned
Requirement:	2 The center shall dynamically price tolls based on current traffic condition information.	Planned
Requirement:	5 The center shall manage the details of toll payment violations based on tag information from the toll plaza, vehicle registration information from the Department of Motor Vehicles, invalid tag information from a Financial Institution, and previous violation information stored locally, and report such violations to appropriate law enforcement agencies.	Planned
Requirement:	10 The center shall support wide-area alerts from emergency centers by passing on the information to its toll plazas and the Toll Administrator.	Planned

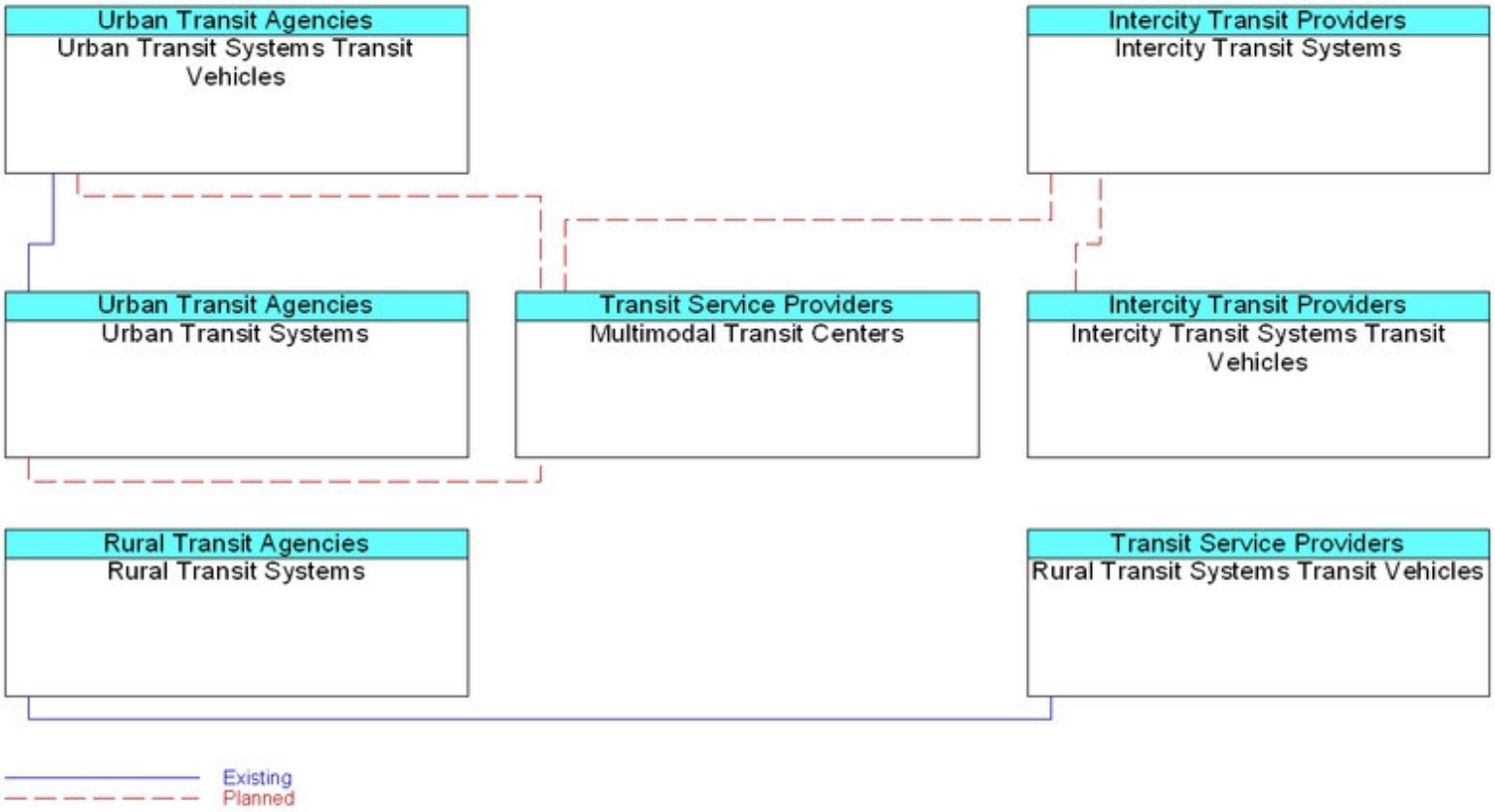
NOTE: The two Entities above are the only two new items in the Functional Requirements. They have been shown here, as well as in Appendix E. The remaining items did not change since Version 2.0 and have not been reprinted.

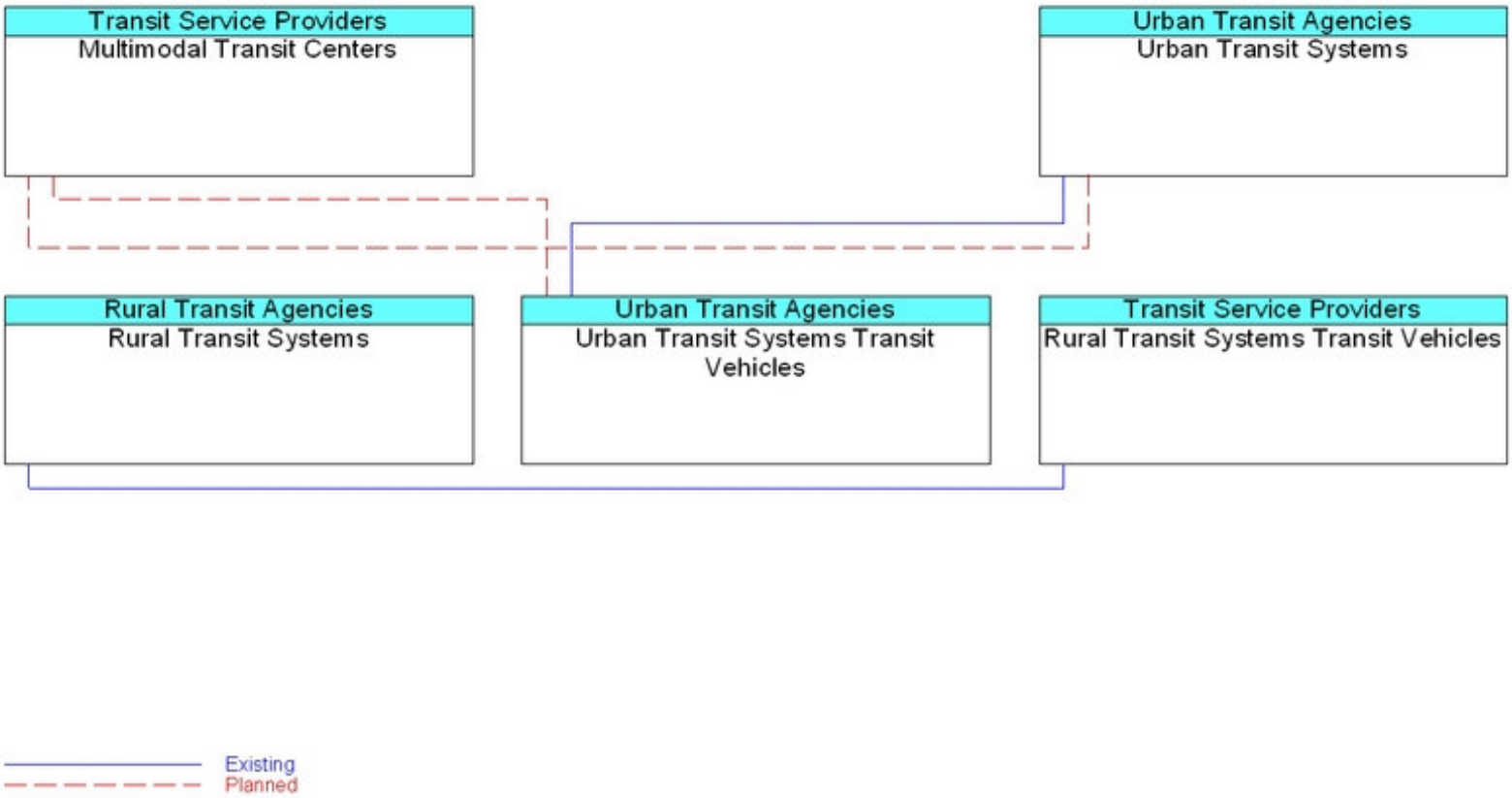
Appendix C: Architecture Interconnect Diagrams

NOTE: Because of the large amount of data that can flow between different elements, many of the diagrams generated by Turbo Architecture are illegible. Detailed information on these diagrams can be found in the "Interconnects" section of the "Interfaces" tab within Turbo. It is here that interconnects can be seen between origin and destination elements.


County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
County Engineering and City Public ...
County and City Maintenance and Construction Offices
County and City Parking Operators
County and City Smart Parking Systems
Counties and Cities
County and City Databases
County and City 911 Dispatch Centers
Emergency Response Performance Information
County Engineering and City Public ...
County and City TMCs
County Emergency Management Age...
County Emergency Operations Centers
Existing
Planned


Mississippi Department of Transporta...
MDOT Highway Performance Monitoring System (HPMS)
Metropolitan Planning Organizations ...
MPO Databases
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Counties and Cities
County and City Databases
Rural Transit Agencies
Rural Transit Systems
Mississippi Highway Patrol (MHP)
MHP Central and District Offices
Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transporta...
MDOT ExpressPass Permitting System
Transit Service Providers
Multimodal Transit Centers
Mississippi Department of Transporta...
MDOT Accident Database
Mississippi Department of Transporta...
MDOT CVISN Credentialing Infrastructure System
Urban Transit Agencies
Urban Transit Systems
Existing
Planned


Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Intercity Transit Providers
Intercity Transit Systems
Urban Transit Agencies
Urban Transit Systems
Transit Service Providers
Multimodal Transit Centers
Intercity Transit Providers
Intercity Transit Systems Transit Vehicles
Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Rural Transit Systems Transit Vehicles
Existing
Planned


Transit Service Providers
Multimodal Transit Centers
Urban Transit Agencies
Urban Transit Systems
Rural Transit Agencies
Rural Transit Systems
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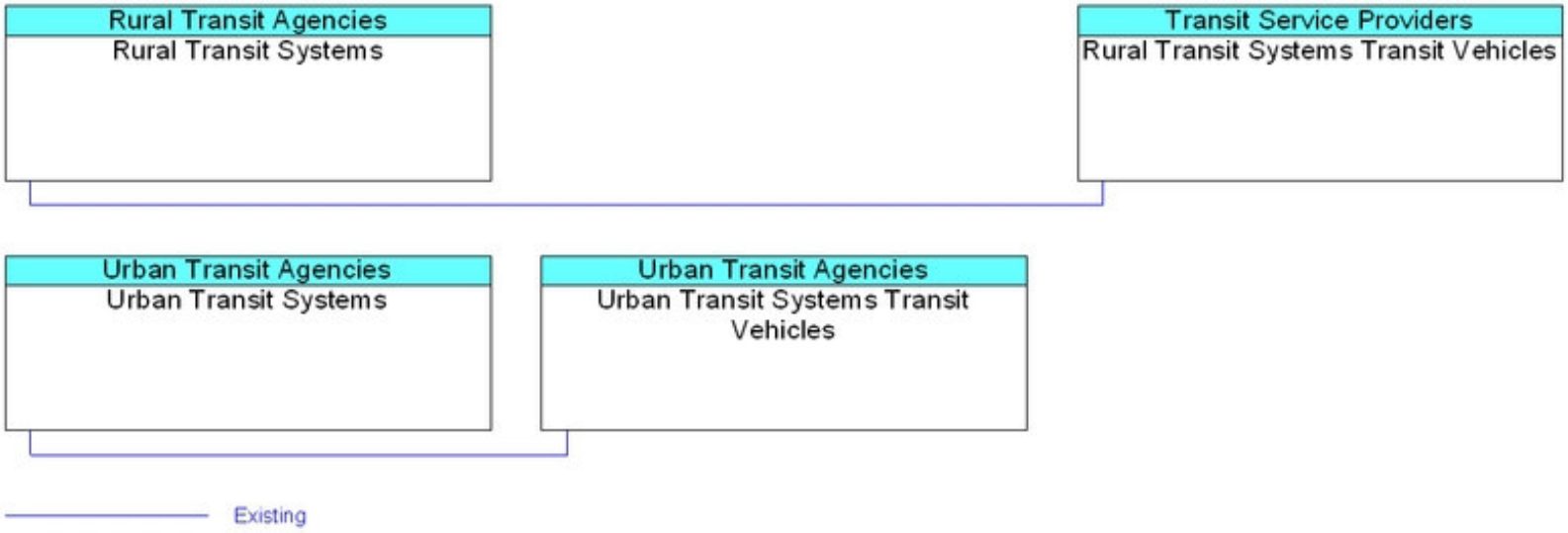
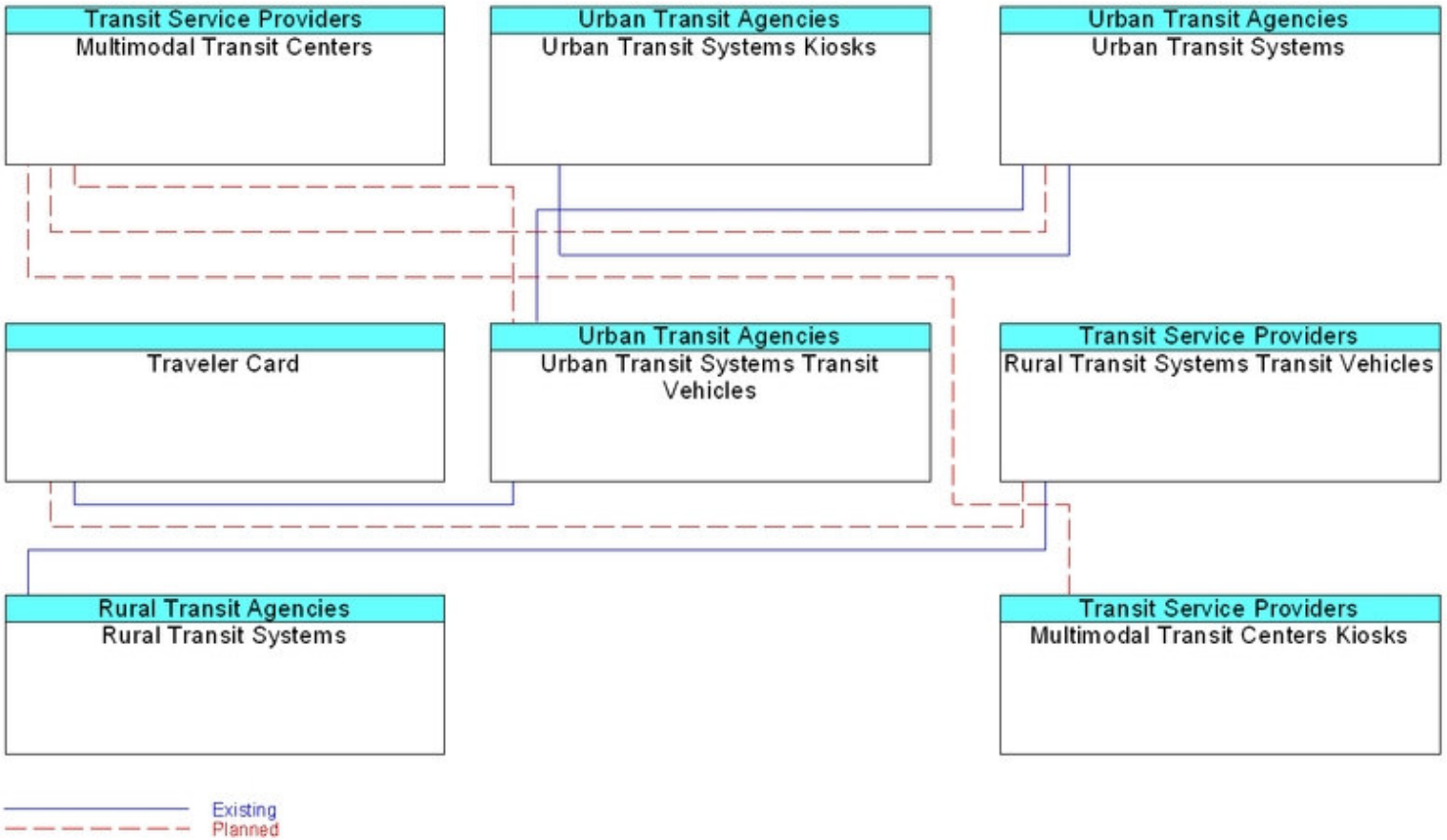
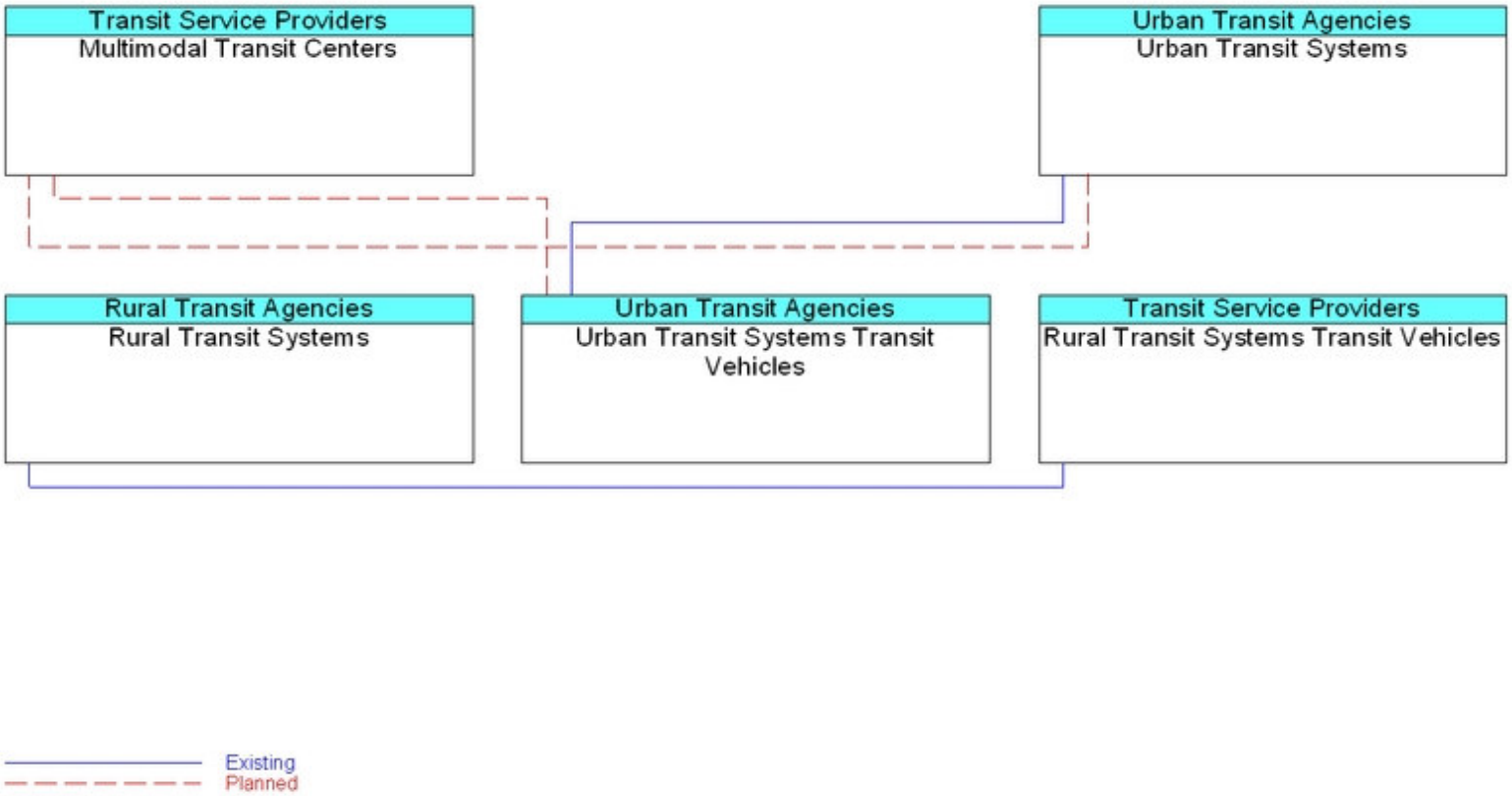
Urban Transit Systems Transit Vehicles
Transit Service Providers
Rural Transit Systems Transit Vehicles
Existing
Planned


Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Rural Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Existing


Transit Service Providers
Multimodal Transit Centers
Urban Transit Agencies
Urban Transit Systems Kiosks
Urban Transit Agencies
Urban Transit Systems
Traveler Card
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Transit Service Providers
Rural Transit Systems Transit Vehicles
Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Multimodal Transit Centers Kiosks
Existing
Planned


Transit Service Providers
Multimodal Transit Centers
Urban Transit Agencies
Urban Transit Systems
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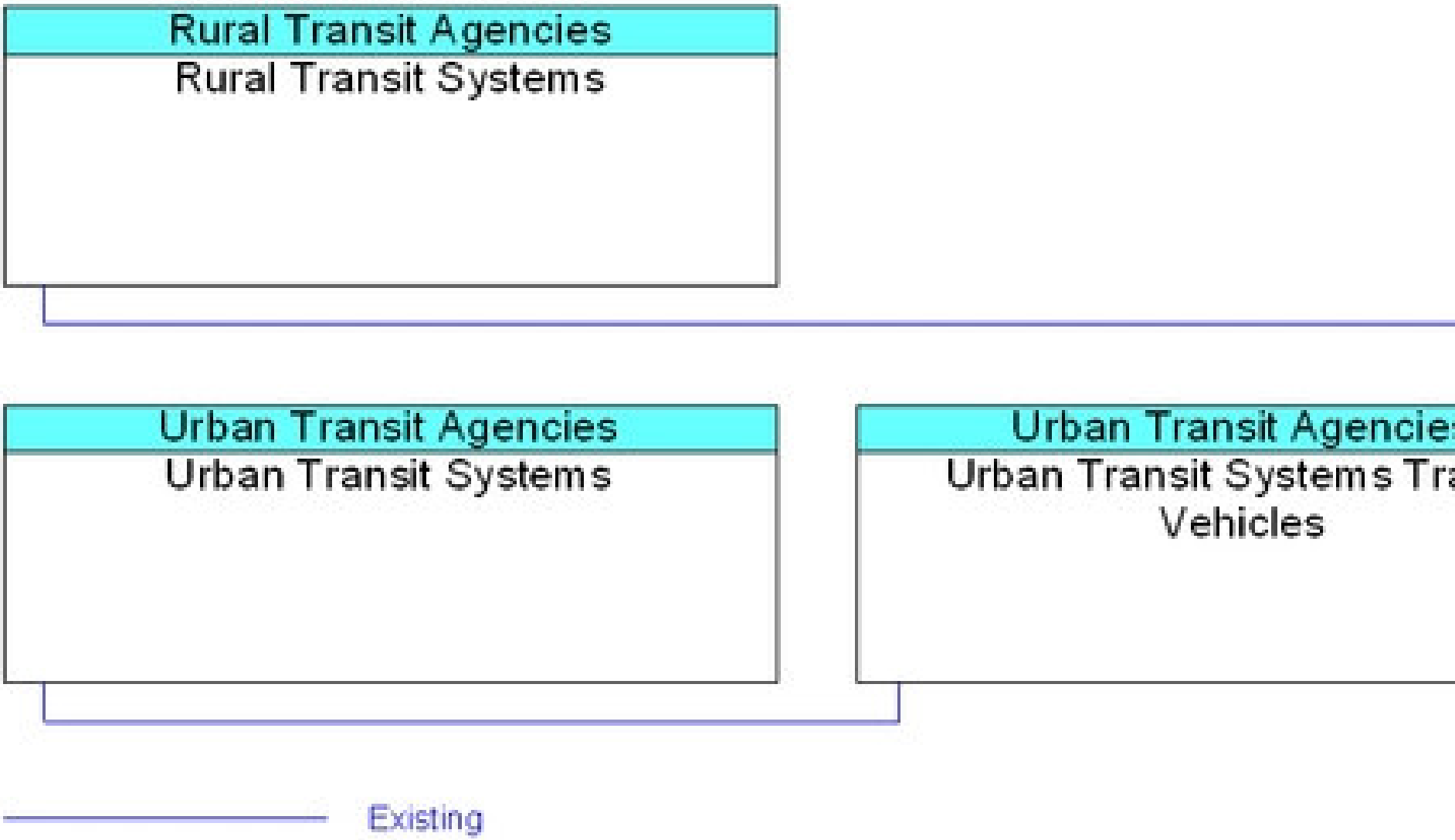
Rural Transit Systems
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Transit Service Providers
Rural Transit Systems Transit Vehicles
Existing
Planned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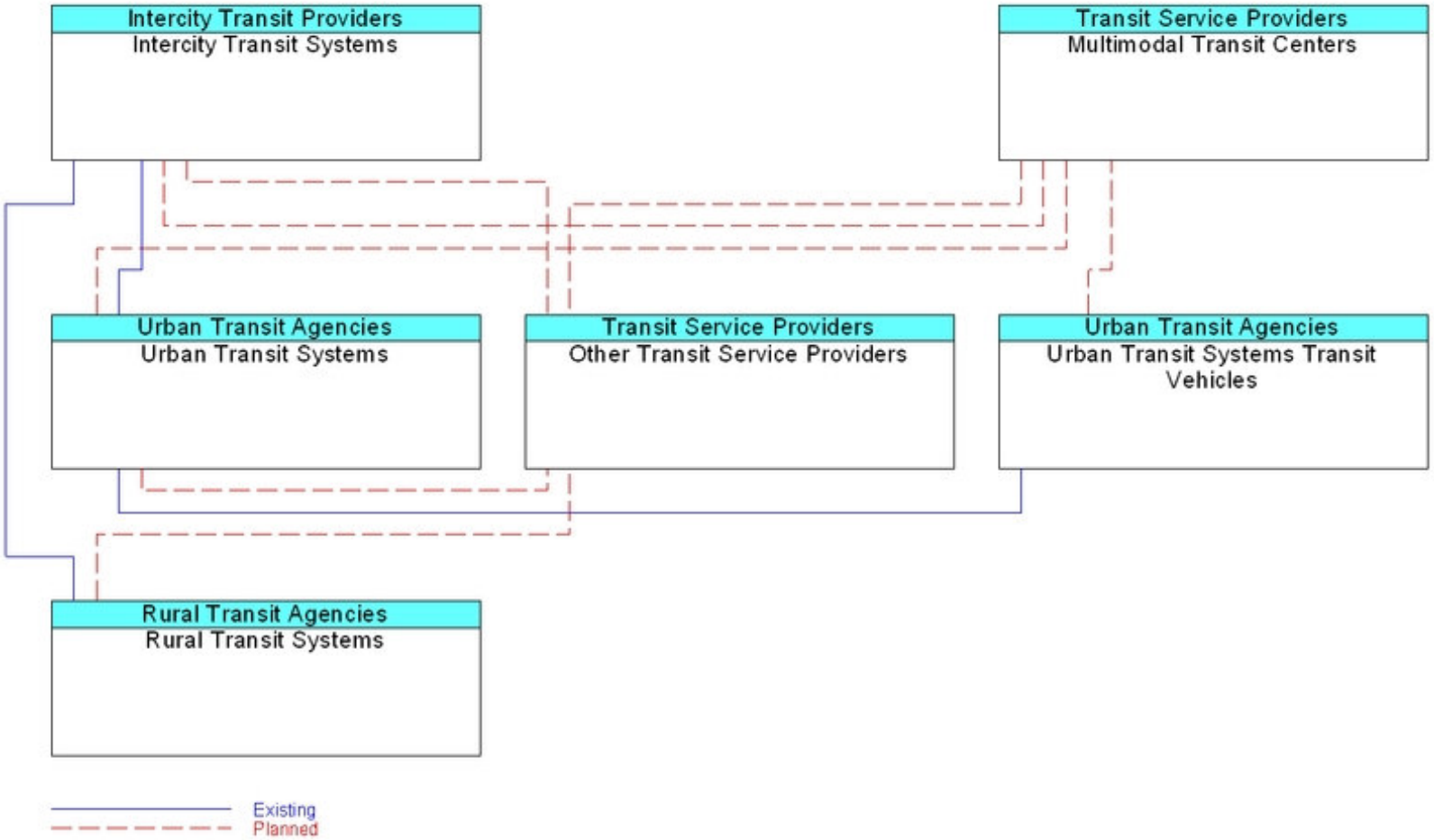
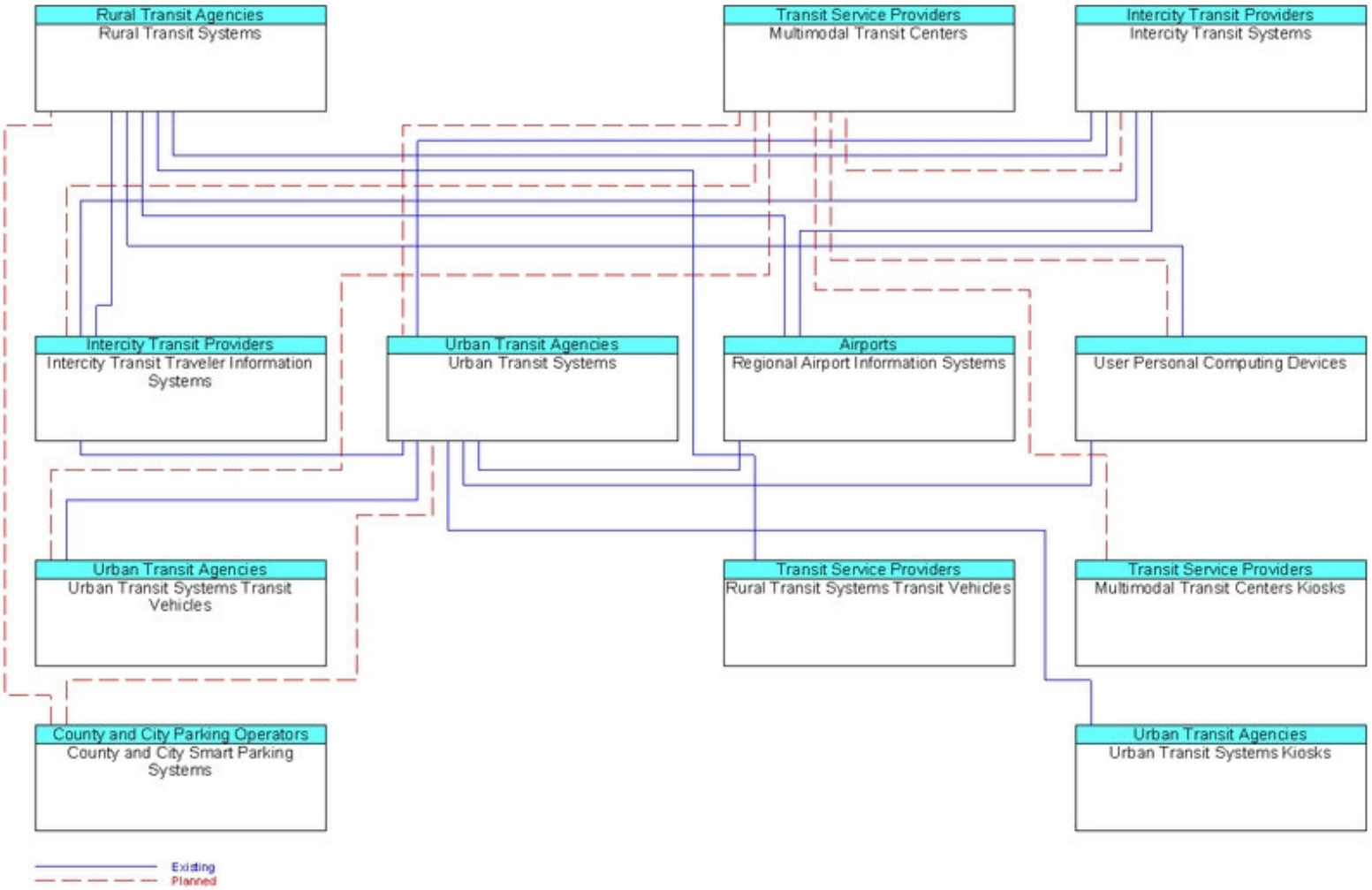
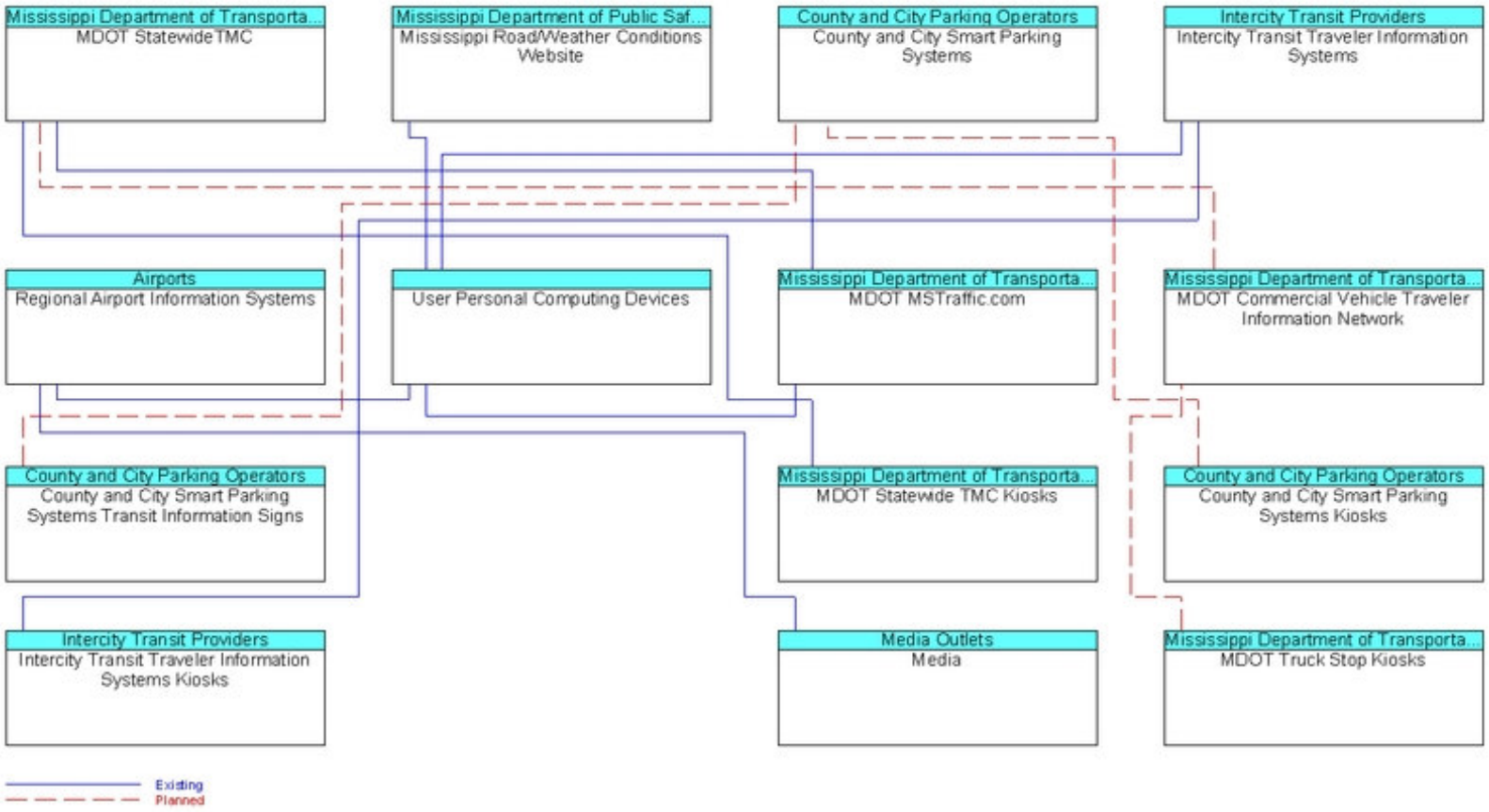
Rural Transit Systems
Urban Transit Agencies
Urban Transit Systems
Urban Transit Agencie
Urban Transit Systems Tra
Vehicles
Existing


Intercity Transit Providers
Intercity Transit Systems
Transit Service Providers
Multimodal Transit Centers
Urban Transit Agencies
Urban Transit Systems
Transit Service Providers
Other Transit Service Providers
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Rural Transit Agencies
Rural Transit Systems
Existing
Planned


Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Multimodal Transit Centers
Intercity Transit Providers
Intercity Transit Systems
Intercity Transit Providers
Intercity Transit Traveler Information Systems
Urban Transit Agencies
Urban Transit Systems
Airports
Regional Airport Information Systems
User Personal Computing Devices
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Transit Service Providers
Rural Transit Systems Transit Vehicles
Transit Service Providers
Multimodal Transit Centers Kiosks
County and City Parking Operators
County and City Smart Parking Systems
Urban Transit Agencies
Urban Transit Systems Kiosks
Existing
Planned


Mississippi Department of Transporta...
MDOT Statewide TMC
Mississippi Department of Public Saf...
Mississippi Road/Weather Conditions Website
County and City Parking Operators
County and City Smart Parking Systems
Intercity Transit Providers
Intercity Transit Traveler Information Systems
Airports
Regional Airport Information Systems
User Personal Computing Devices
Mississippi Department of Transporta...
MDOT MSTraffic.com
Mississippi Department of Transporta...
MDOT Commercial Vehicle Traveler Information Network
County and City Parking Operators
County and City Smart Parking Systems Transit Information Signs
Mississippi Department of Transporta...
MDOT Statewide TMC Kiosks
County and City Parking Operators
County and City Smart Parking Systems Kiosks
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Intercity Transit Traveler Information Systems Kiosks
Media Outlets
Media
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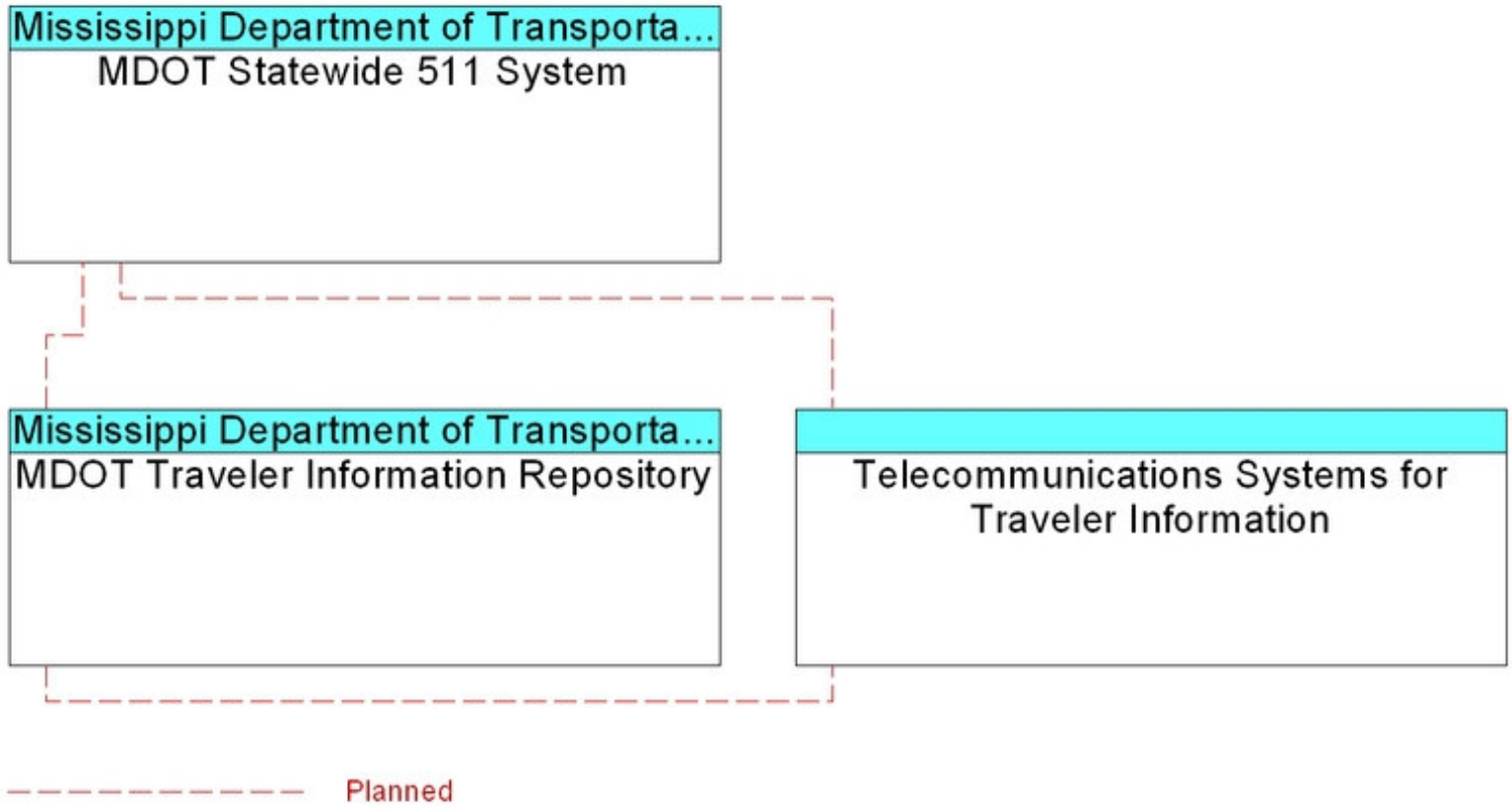
MDOT Truck Stop Kiosks
Existing
Planned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Telecommunications Systems for Traveler Information
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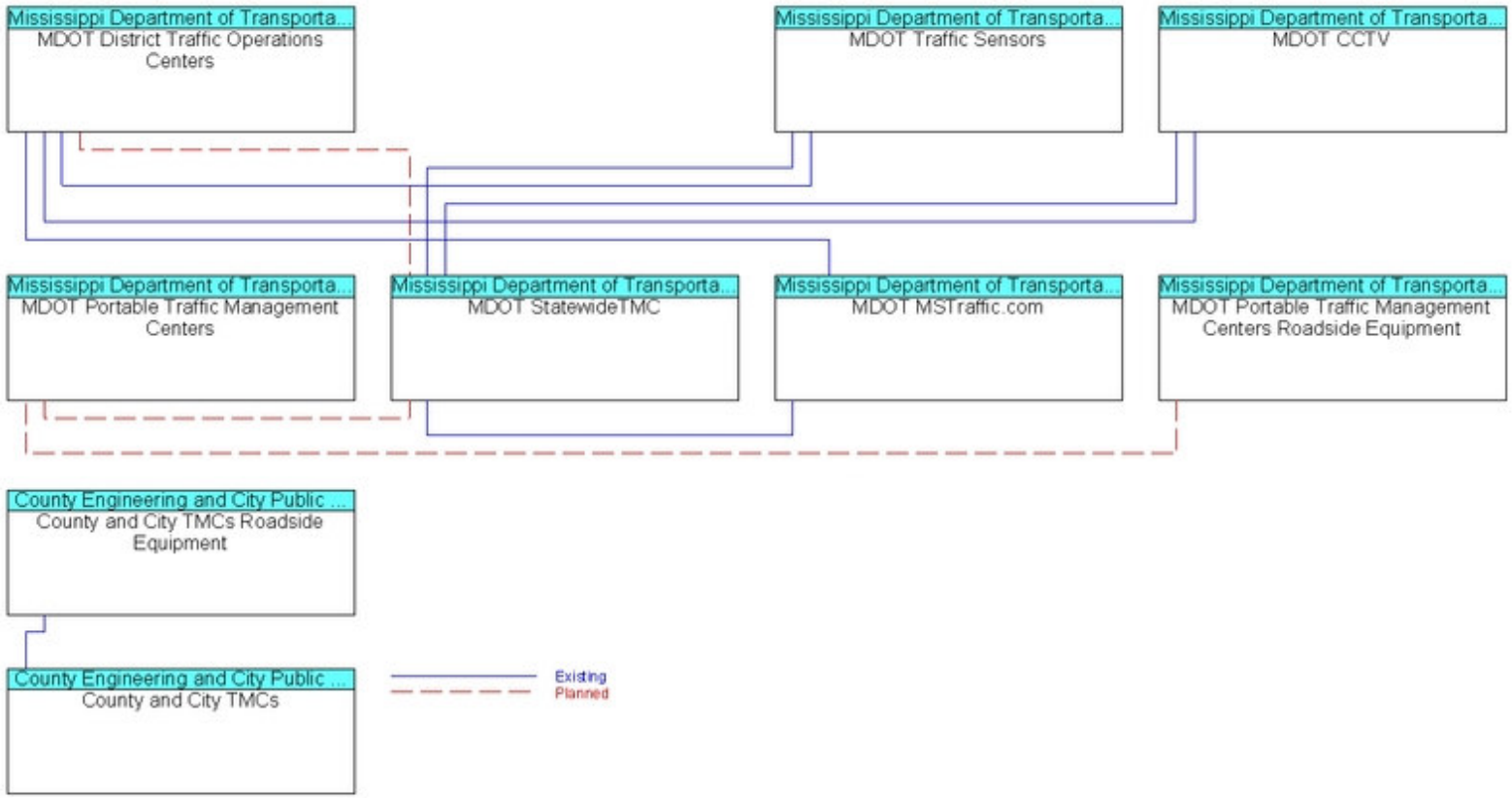
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Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transporta...
MDOT CCTV
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT MSTraffic.com
Mississippi Department of Transporta...
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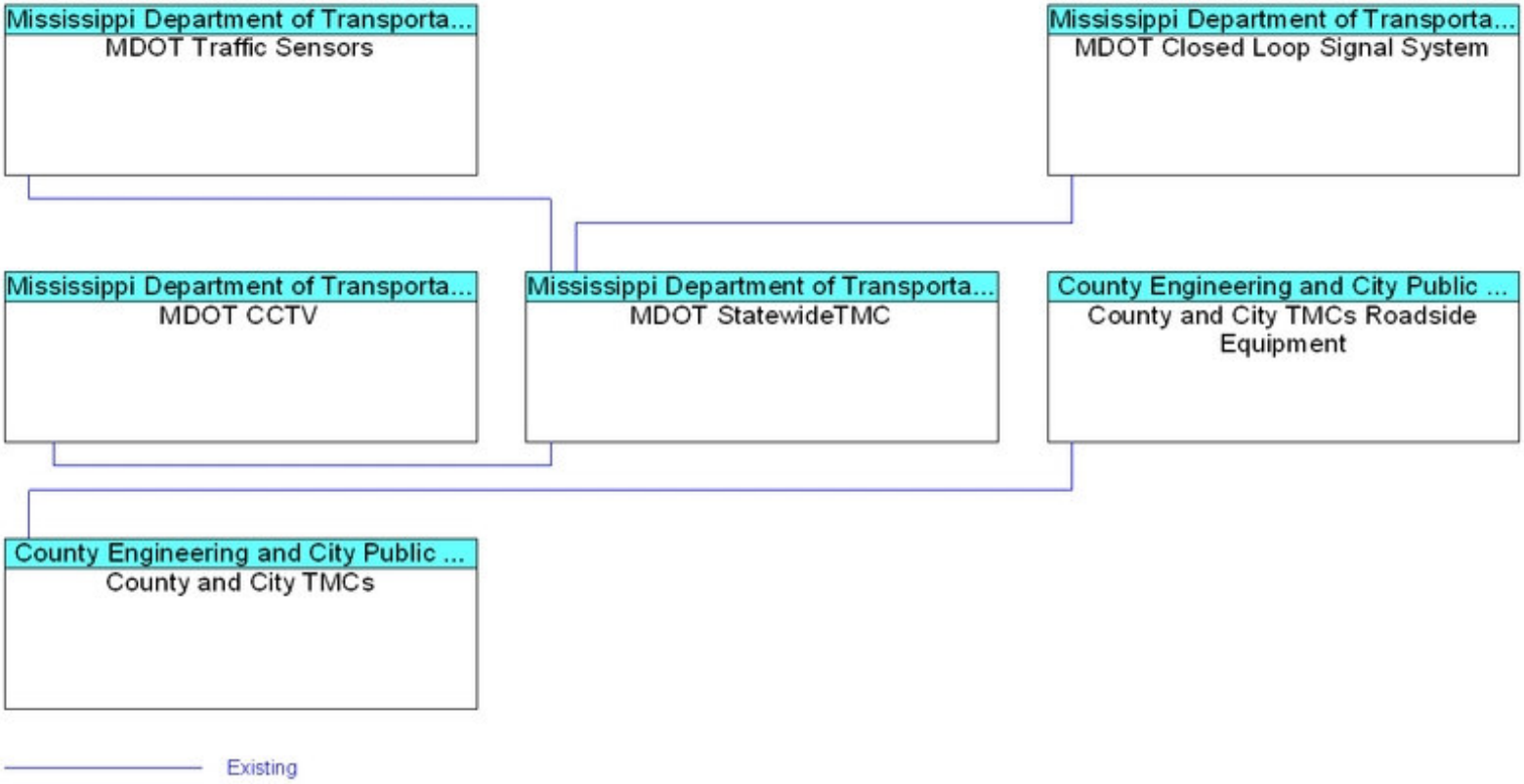
County and City TMCs Roadside Equipment
County Engineering and City Public ...
County and City TMCs
Existing
Planned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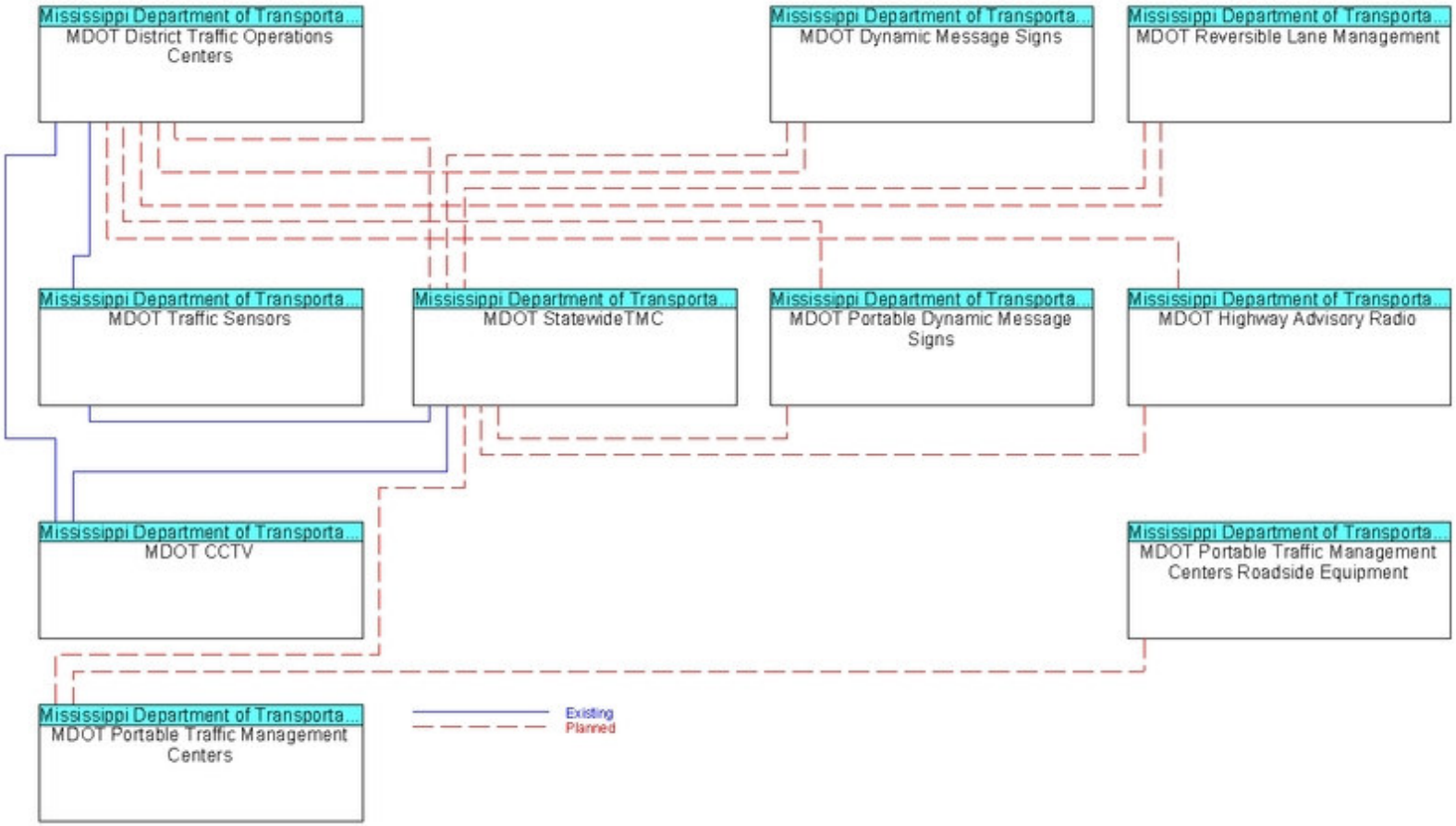
MDOT Closed Loop Signal System
Mississippi Department of Transporta...
MDOT CCTV
Mississippi Department of Transporta...
MDOT StatewideTMC
County Engineering and City Public ...
County and City TMCs Roadside Equipment
County Engineering and City Public ...
County and City TMCs
Existing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Mississippi Department of Transporta...
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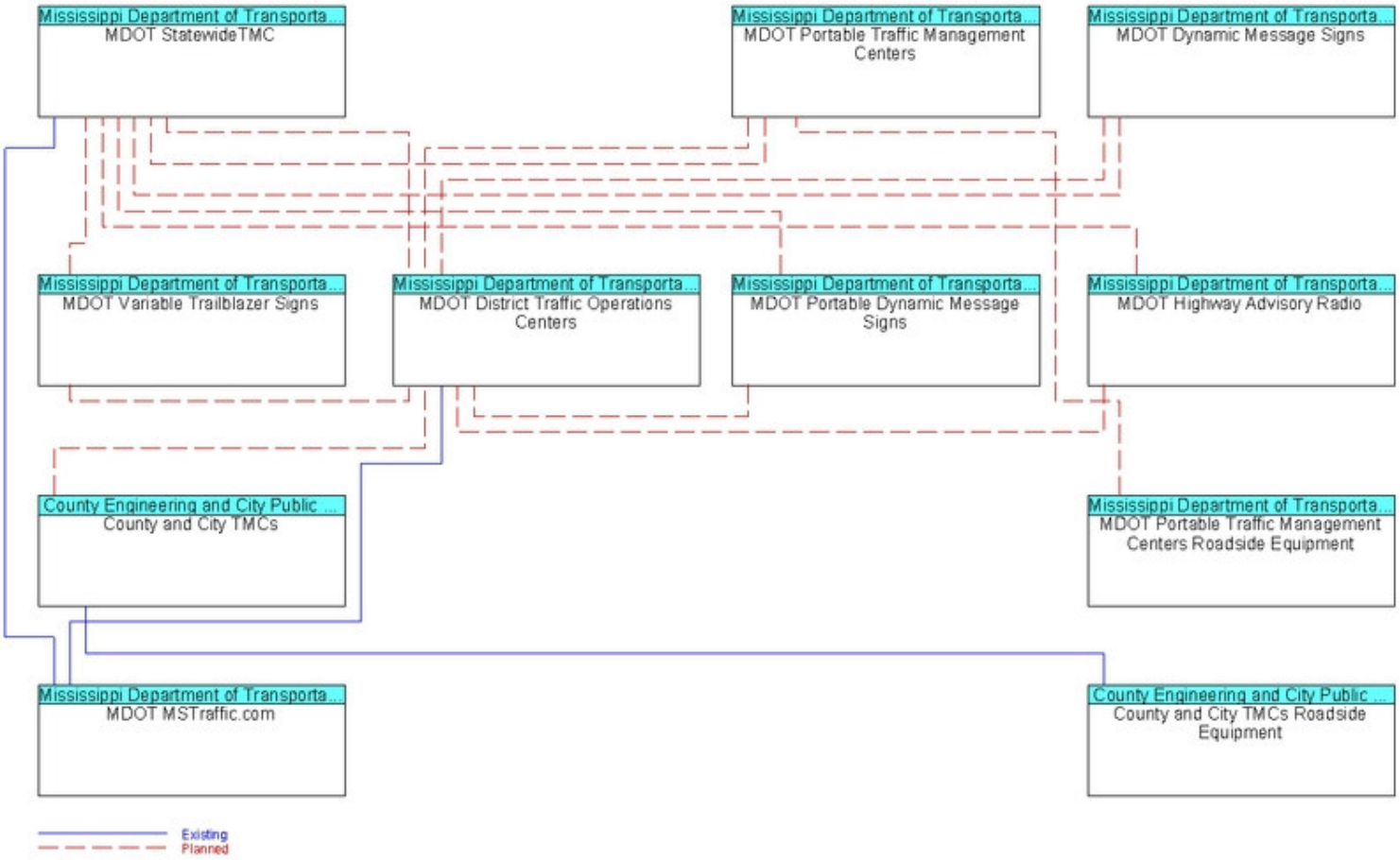
Mississippi Department of Transporta...
MDOT Reversible Lane Management
Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Portable Dynamic Message Signs
Mississippi Department of Transporta...
MDOT Highway Advisory Radio
Mississippi Department of Transporta...
MDOT CCTV
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Existing
Planned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Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Mississippi Department of Transporta...
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Mississippi Department of Transporta...
MDOT Variable Trailblazer Signs
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Portable Dynamic Message Signs
Mississippi Department of Transporta...
MDOT Highway Advisory Radio
County Engineering and City Public ...
County and City TMCs
Mississippi Department of Transporta...
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Mississippi Department of Transporta...
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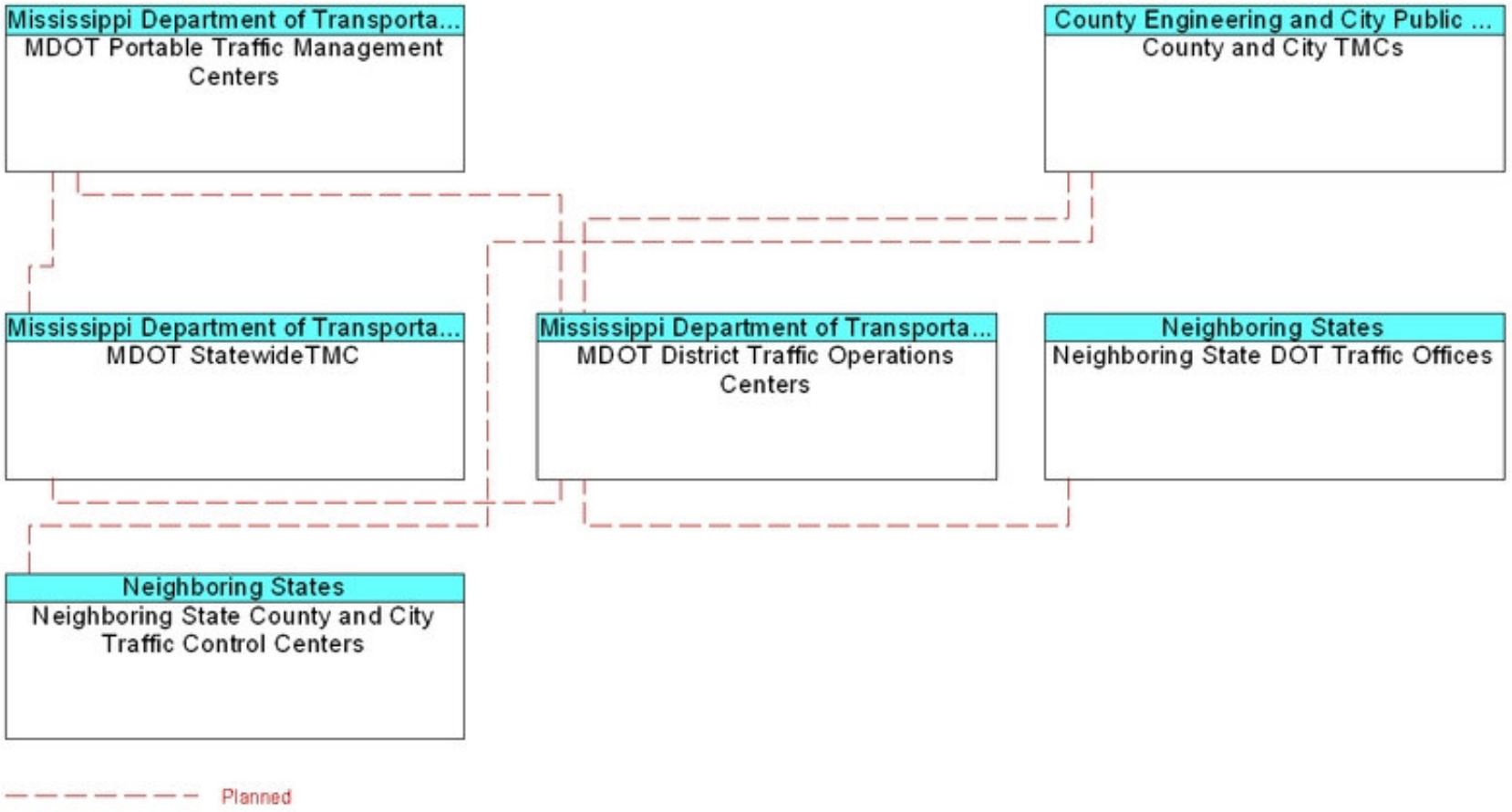
County and City TMCs Roadside Equipment
Existing
Planned


Mississippi Department of Transporta...
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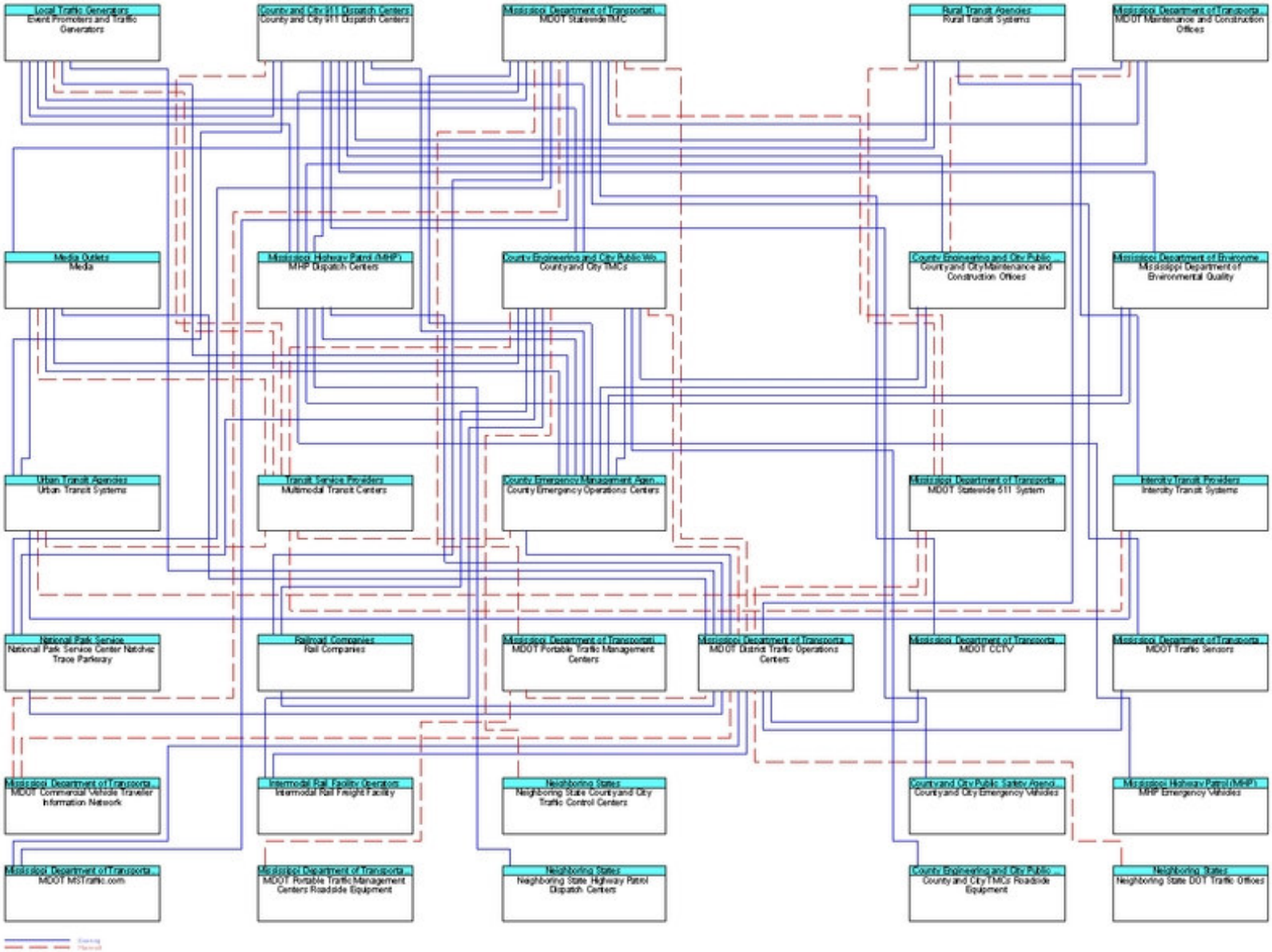
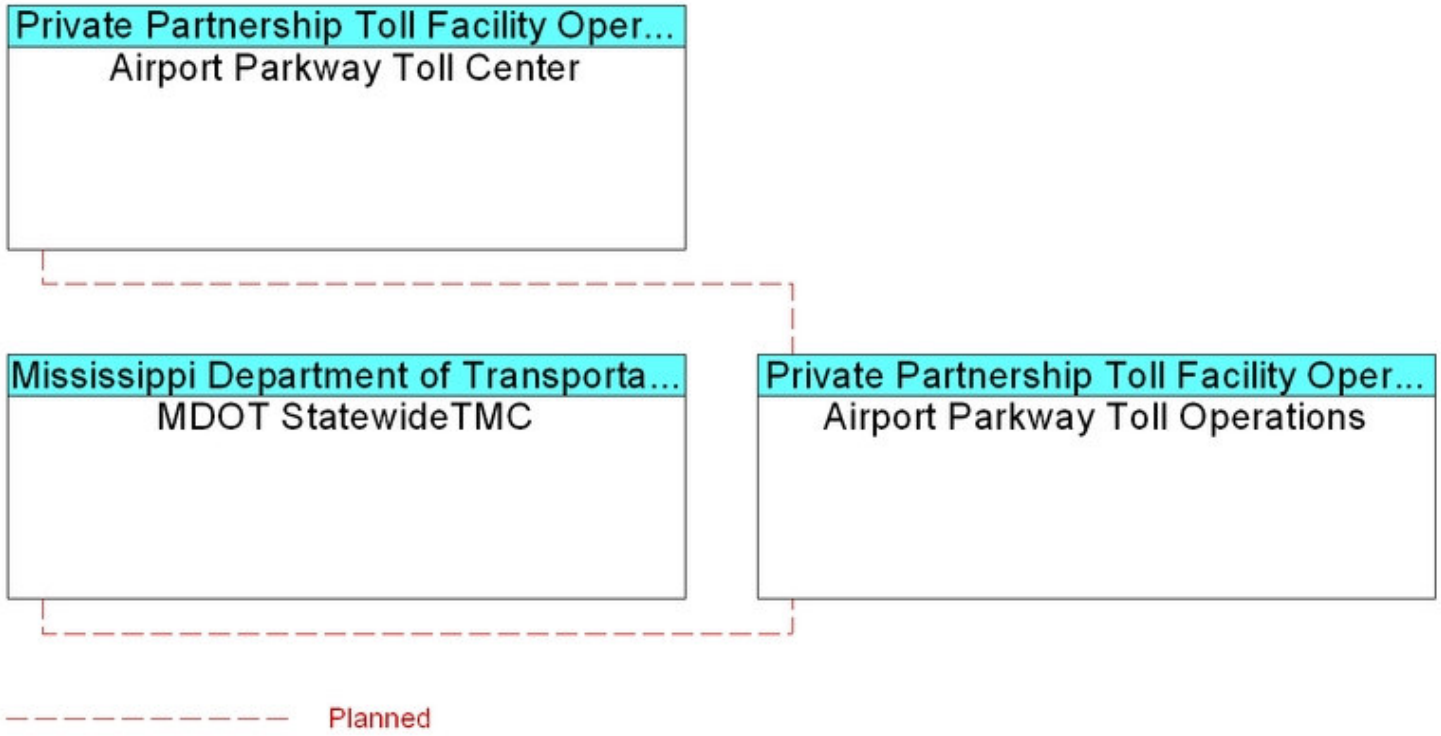
County Engineering and City Public ...
County and City TMCs
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Neighboring States
Neighboring State DOT Traffic Offices
Neighboring States
Neighboring State County and City Traffic Control Centers
Planned


Local Traffic Generators
Event Promoters and Traffic Generators
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
Mississippi Department of Transportati...
MDOT Statewide TMC
Rural Transit Agencies
Rural Transit Systems
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Media Outlets
Media
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
County Engineering and City Public Wo...
County and City TMCs
County Engineering and City Public ...
County and City Maintenance and Construction Offices
Mississippi Department of Environme...
Mississippi Department of Environmental Quality
Urban Transit Agencies
Urban Transit Systems
Transit Service Providers
Multimodal Transit Centers
County Emergency Management Agen...
County Emergency Operations Centers
Mississippi Department of Transporta...
MDOT Statewide 511 System
Intercity Transit Providers
Intercity Transit Systems
National Park Service
National Park Service Center Natchez Trace Parkway
Railroad Companies
Rail Companies
Mississippi Department of Transportat...
MDOT Portable Traffic Management Centers
Mississippi Department of Transportat...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT CCTV
Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transporta...
MDOT Commercial Vehicle Traveler Information Network
Intermodal Rail Facility Operators
Intermodal Rail Freight Facility
Neighboring States
Neighboring State County and City Traffic Control Centers
County and City Public Safety Agenci...
County and City Emergency Vehicles
Mississippi Highway Patrol (MHP)
MHP Emergency Vehicles
Mississippi Department of Transporta...
MDOT MSTraffic.com
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
Neighboring States
Neighboring State Highway Patrol Dispatch Centers
County Engineering and City Public ...
County and City TMCs Roadside Equipment
Neighboring States
Neighboring State DOT Traffic Offices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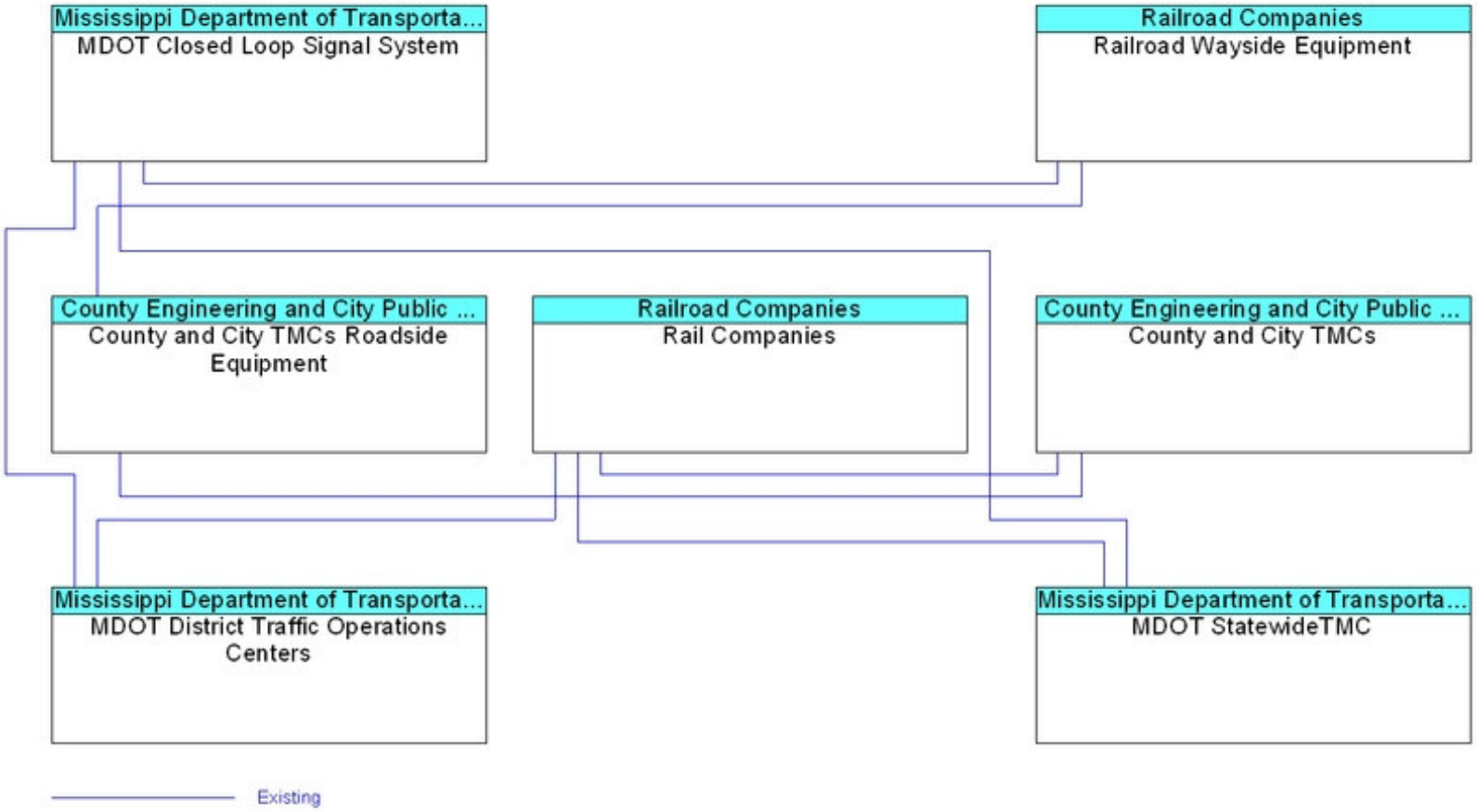
Airport Parkway Toll Center
Mississippi Department of Transporta...
MDOT StatewideTMC
Private Partnership Toll Facility Oper...
Airport Parkway Toll Operations
Planned


Mississippi Department of Transporta...
MDOT Closed Loop Signal System
Railroad Companies
Railroad Wayside Equipment
County Engineering and City Public ...
County and City TMCs Roadside Equipment
Railroad Companies
Rail Companies
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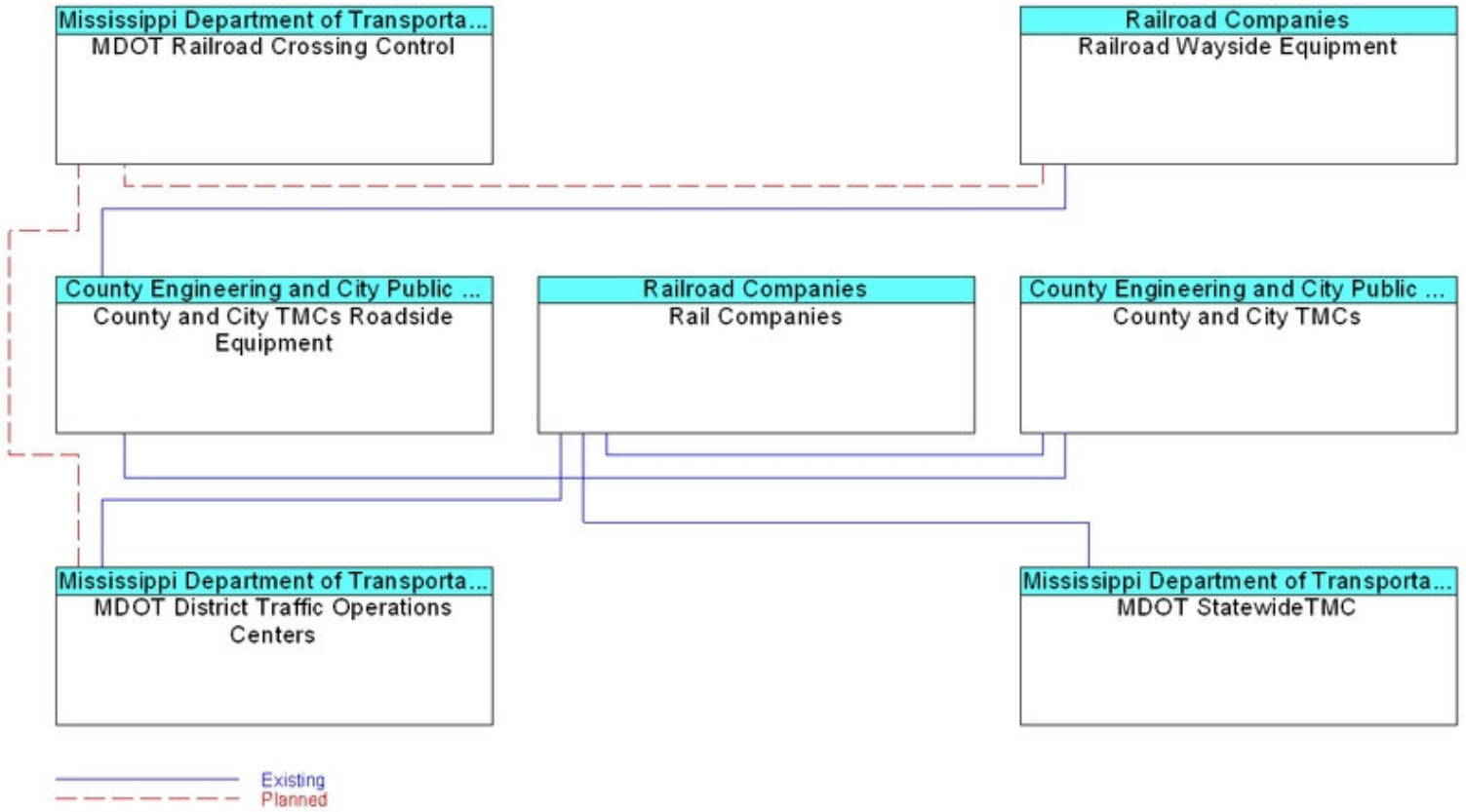
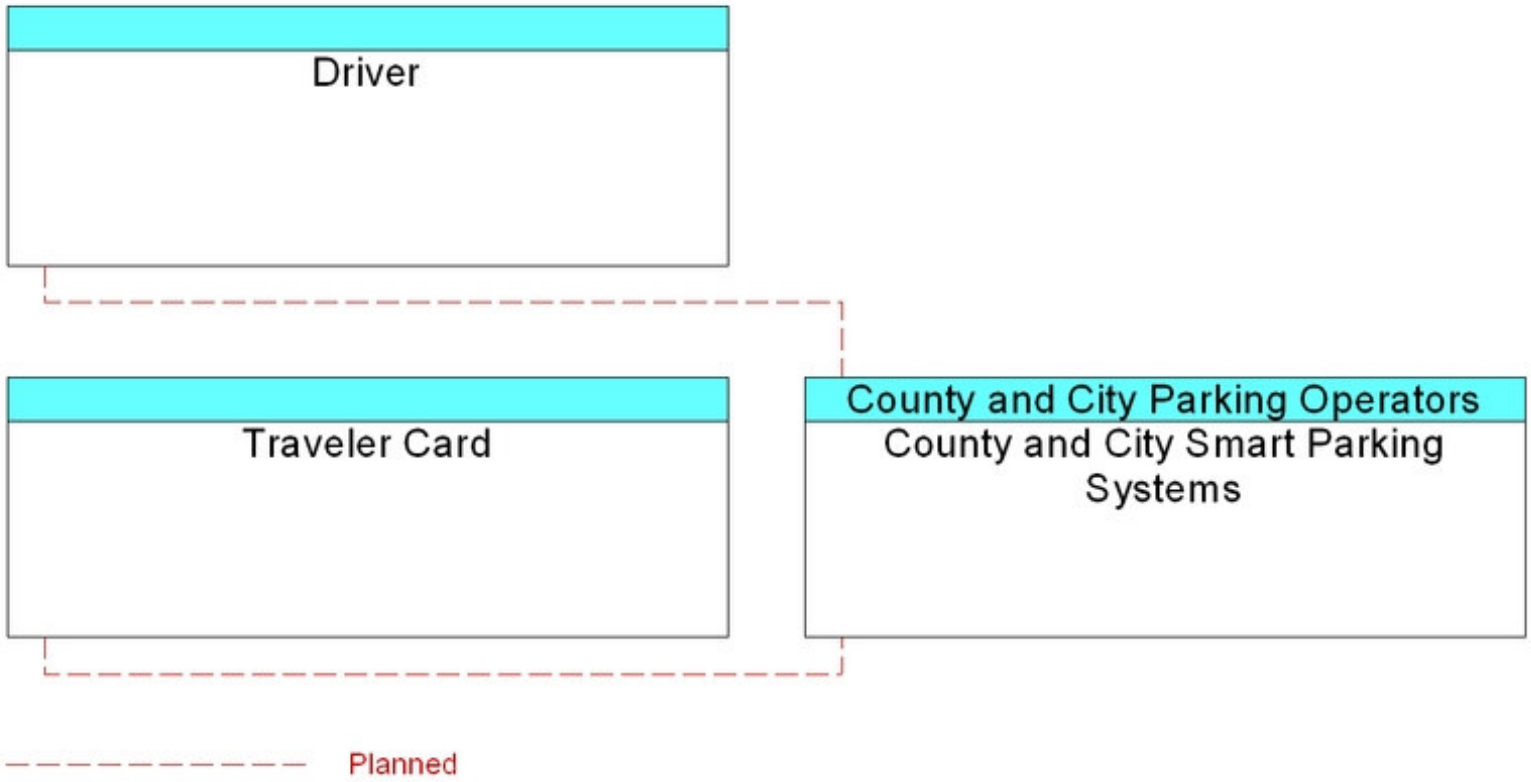
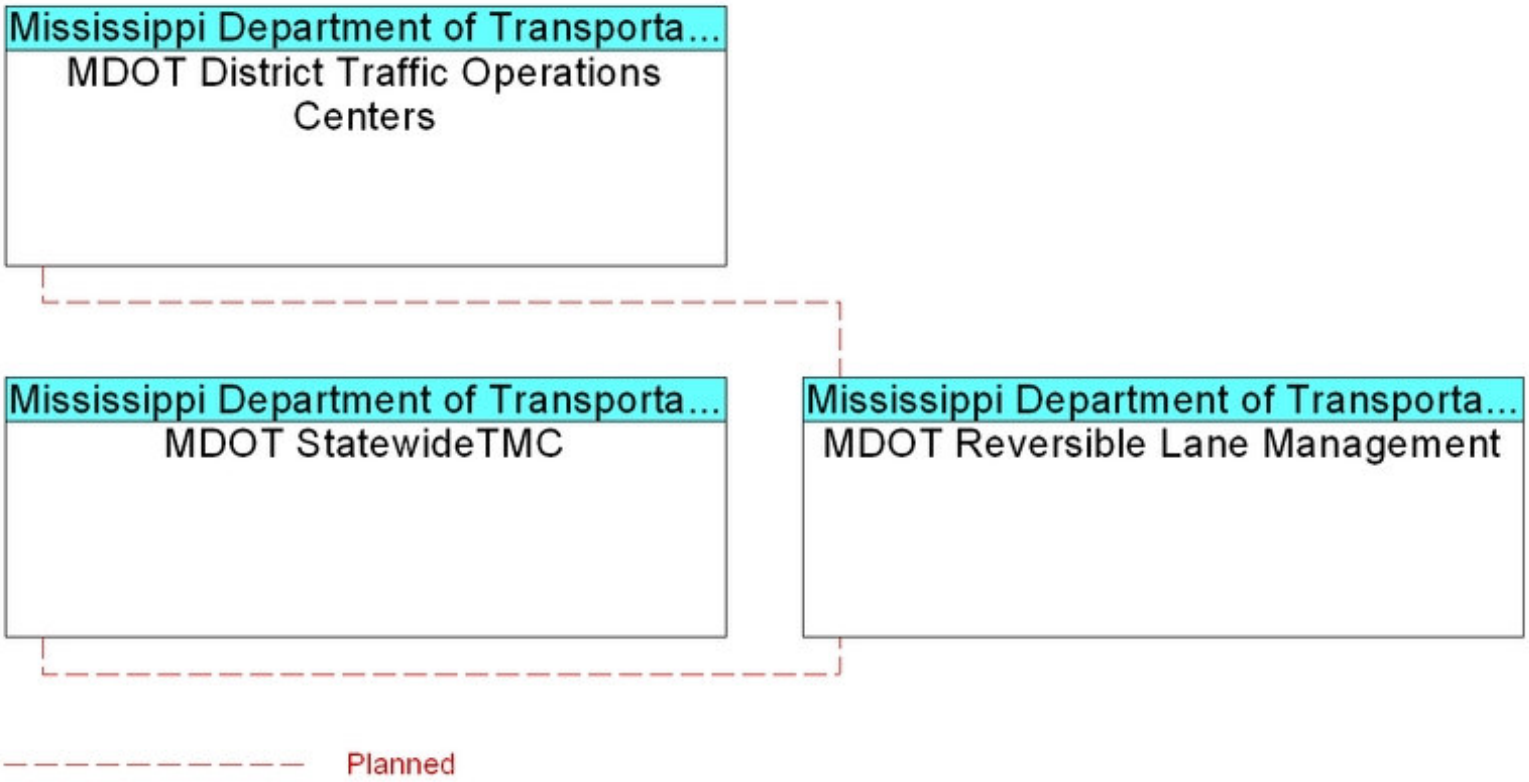
County and City TMCs
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
Existing


Mississippi Department of Transporta...
MDOT Railroad Crossing Control
Railroad Companies
Railroad Wayside Equipment
County Engineering and City Public ...
County and City TMCs Roadside Equipment
Railroad Companies
Rail Companies
County Engineering and City Public ...
County and City TMCs
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
Existing
Planned


Driver
Traveler Card
County and City Parking Operators
County and City Smart Parking Systems
Planned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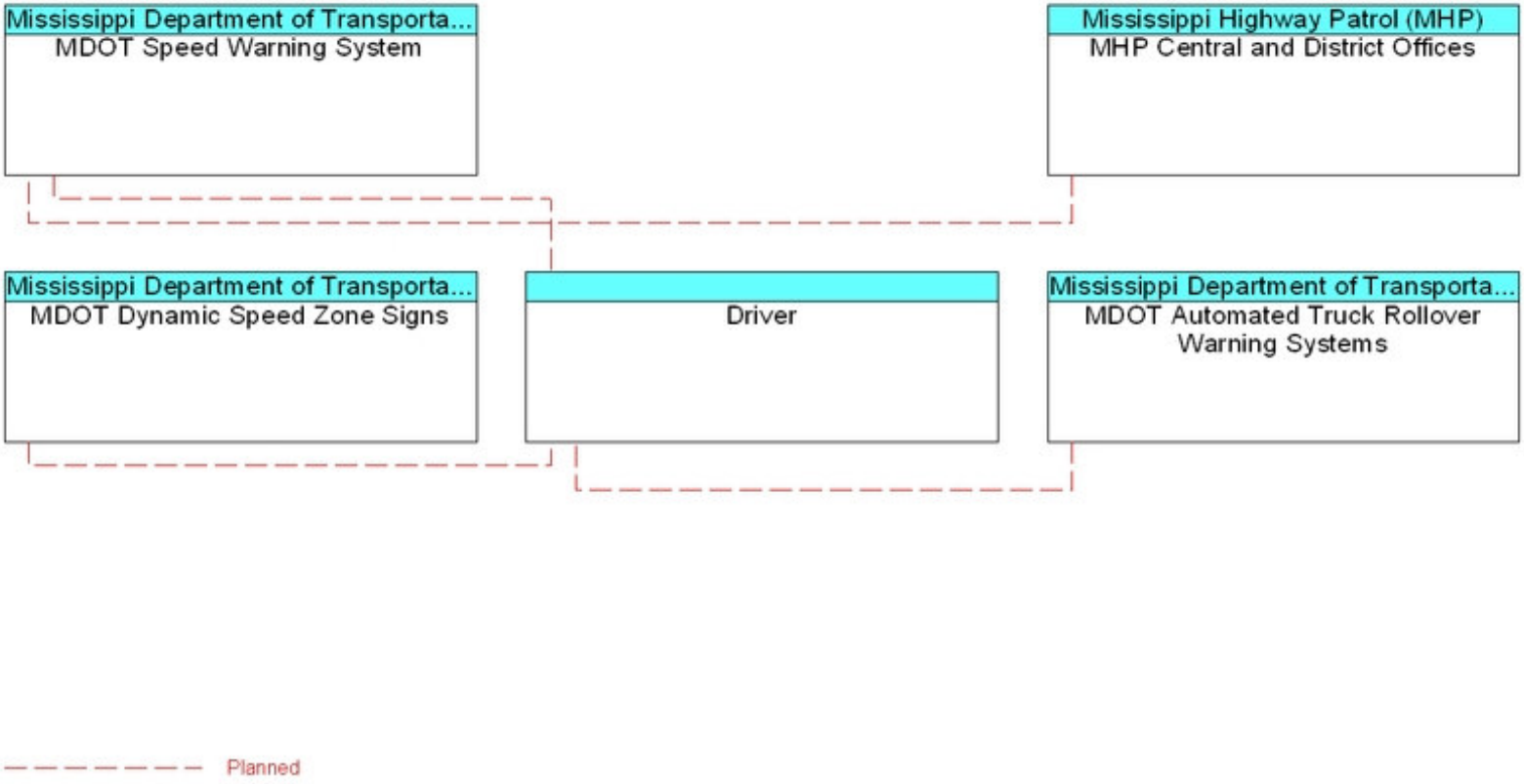
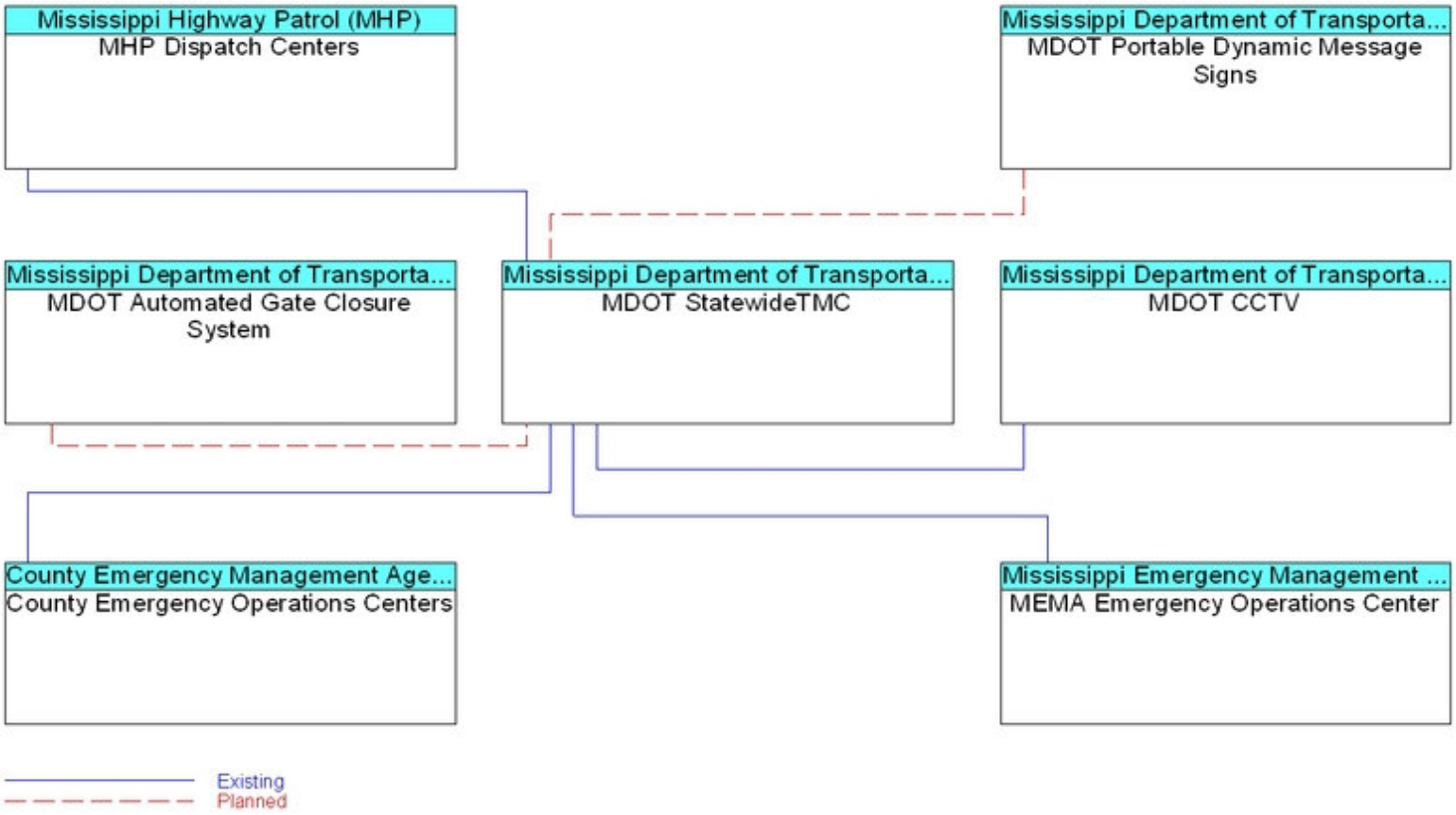
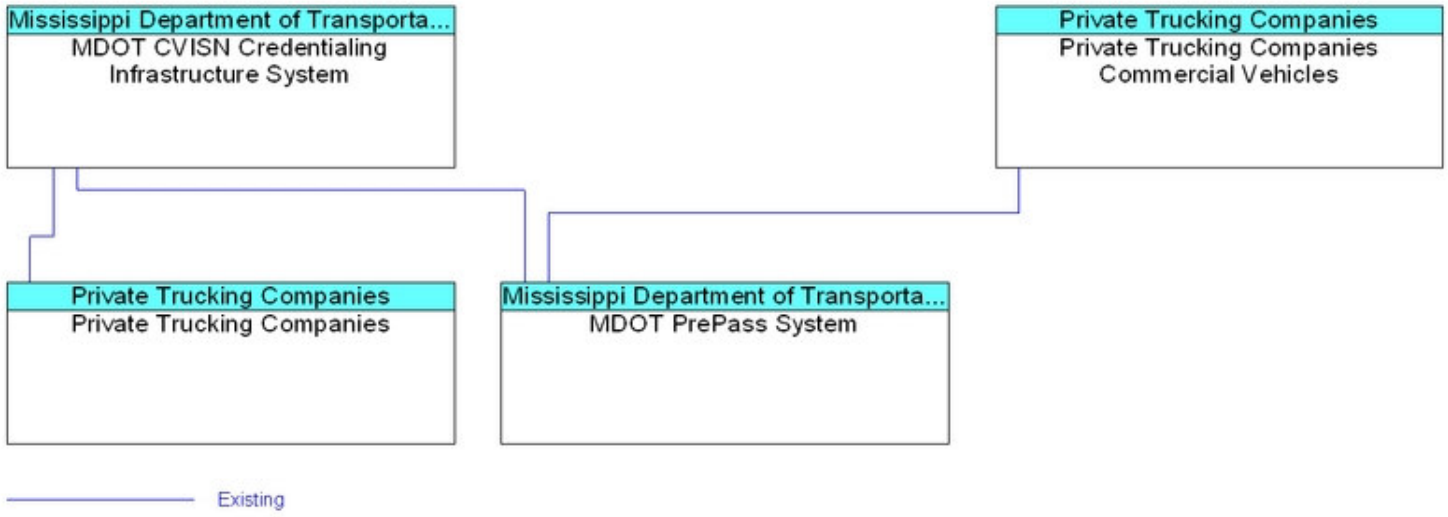
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Reversible Lane Management
Planned


Mississippi Department of Transporta...
MDOT Speed Warning System
Mississippi Highway Patrol (MHP)
MHP Central and District Offices
Mississippi Department of Transporta...
MDOT Dynamic Speed Zone Signs
Driver
Mississippi Department of Transporta...
MDOT Automated Truck Rollover Warning Systems
Planned


Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Mississippi Department of Transporta...
MDOT Portable Dynamic Message Signs
Mississippi Department of Transporta...
MDOT Automated Gate Closure System
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT CCTV
County Emergency Management Age...
County Emergency Operations Centers
Mississippi Emergency Management ...
MEMA Emergency Operations Center
Existing
Planned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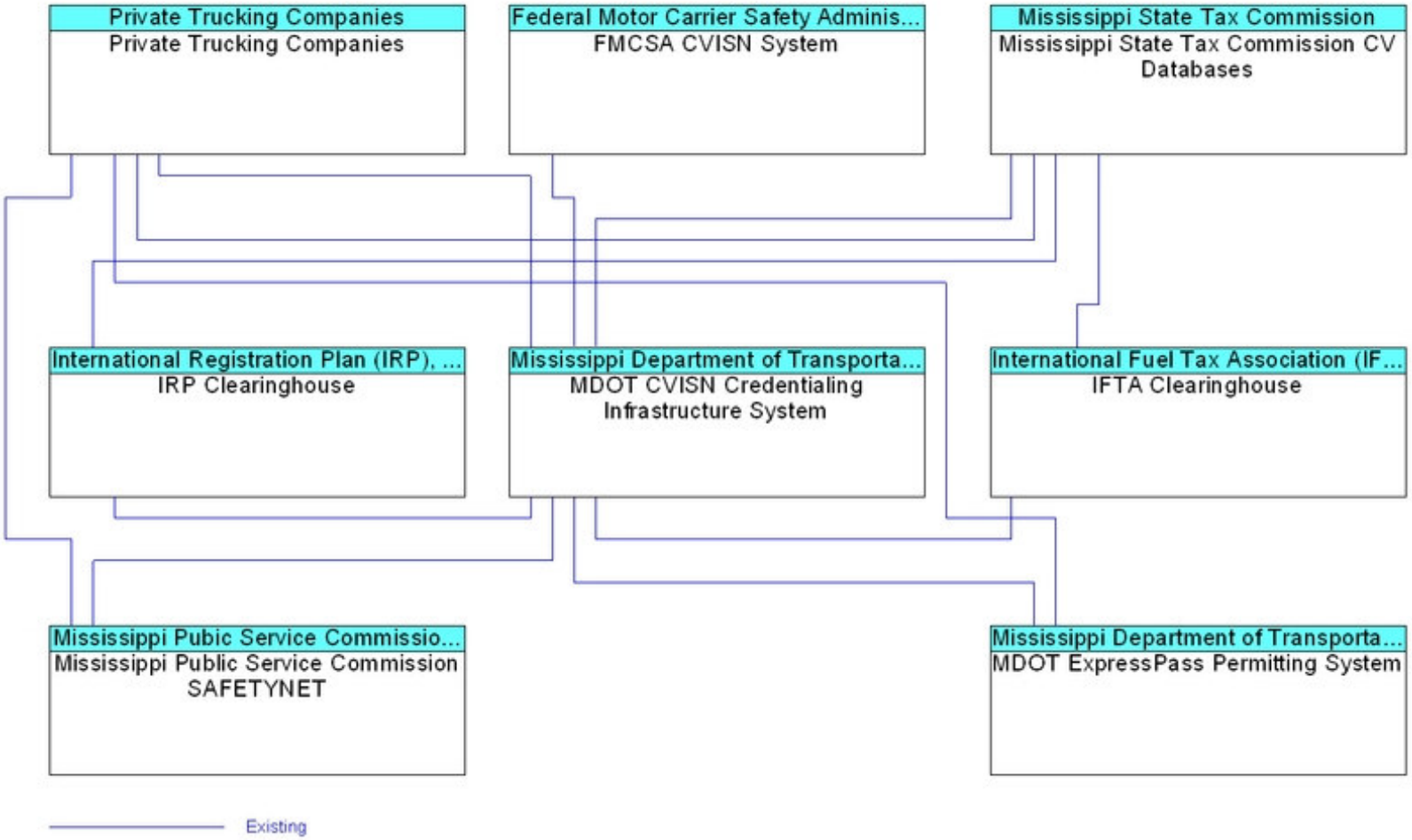
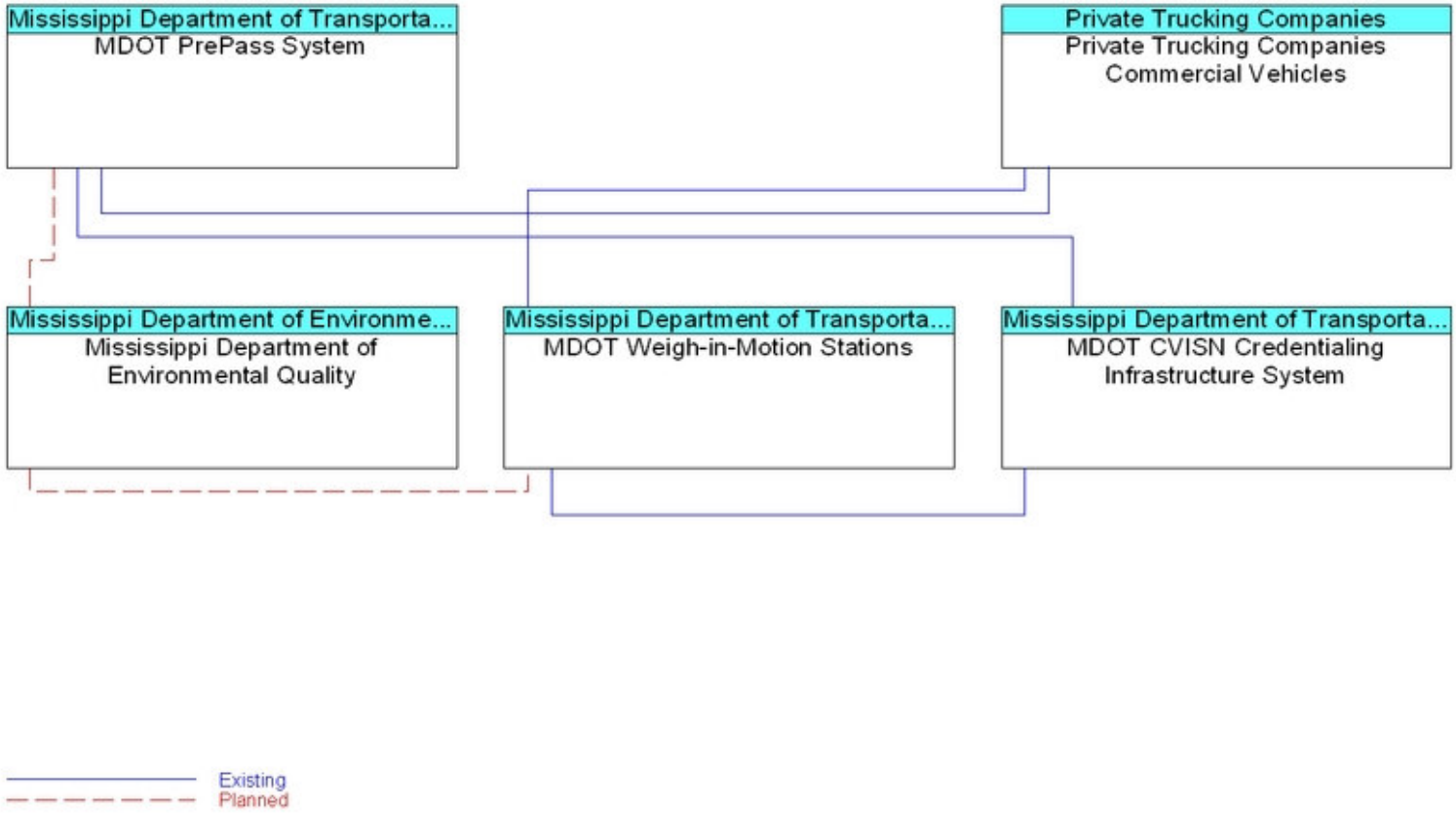
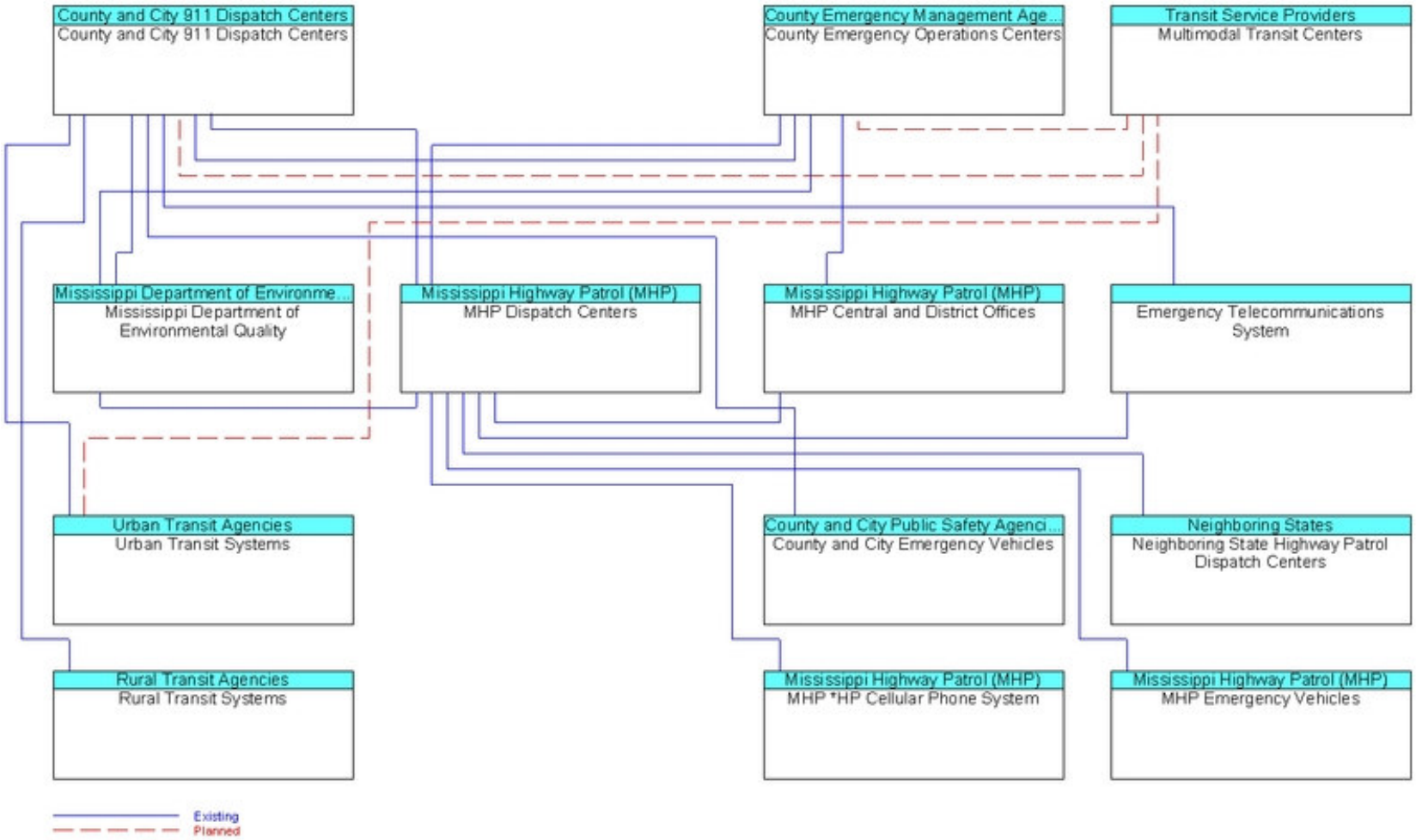
Private Trucking Companies
Private Trucking Companies Commercial Vehicles
Private Trucking Companies
Private Trucking Companies
Mississippi Department of Transporta...
MDOT PrePass System
Existing


Private Trucking Companies
Private Trucking Companies
Federal Motor Carrier Safety Adminis...
FMCSA CVISN System
Mississippi State Tax Commission
Mississippi State Tax Commission CV Databases
International Registration Plan (IRP), ...
IRP Clearinghouse
Mississippi Department of Transporta...
MDOT CVISN Credentialing Infrastructure System
International Fuel Tax Association (IF...
IFTA Clearinghouse
Mississippi Pubic Service Commissio...
Mississippi Public Service Commission SAFETYNET
Mississippi Department of Transporta...
MDOT ExpressPass Permitting System
Existing


Mississippi Department of Transporta...
MDOT PrePass System
Private Trucking Companies
Private Trucking Companies
Commercial Vehicles
Mississippi Department of Environme...
Mississippi Department of
Environmental Quality
Mississippi Department of Transporta...
MDOT Weigh-in-Motion Stations
Mississippi Department of Transporta...
MDOT CVISN Credentialing
Infrastructure System
Existing
Planned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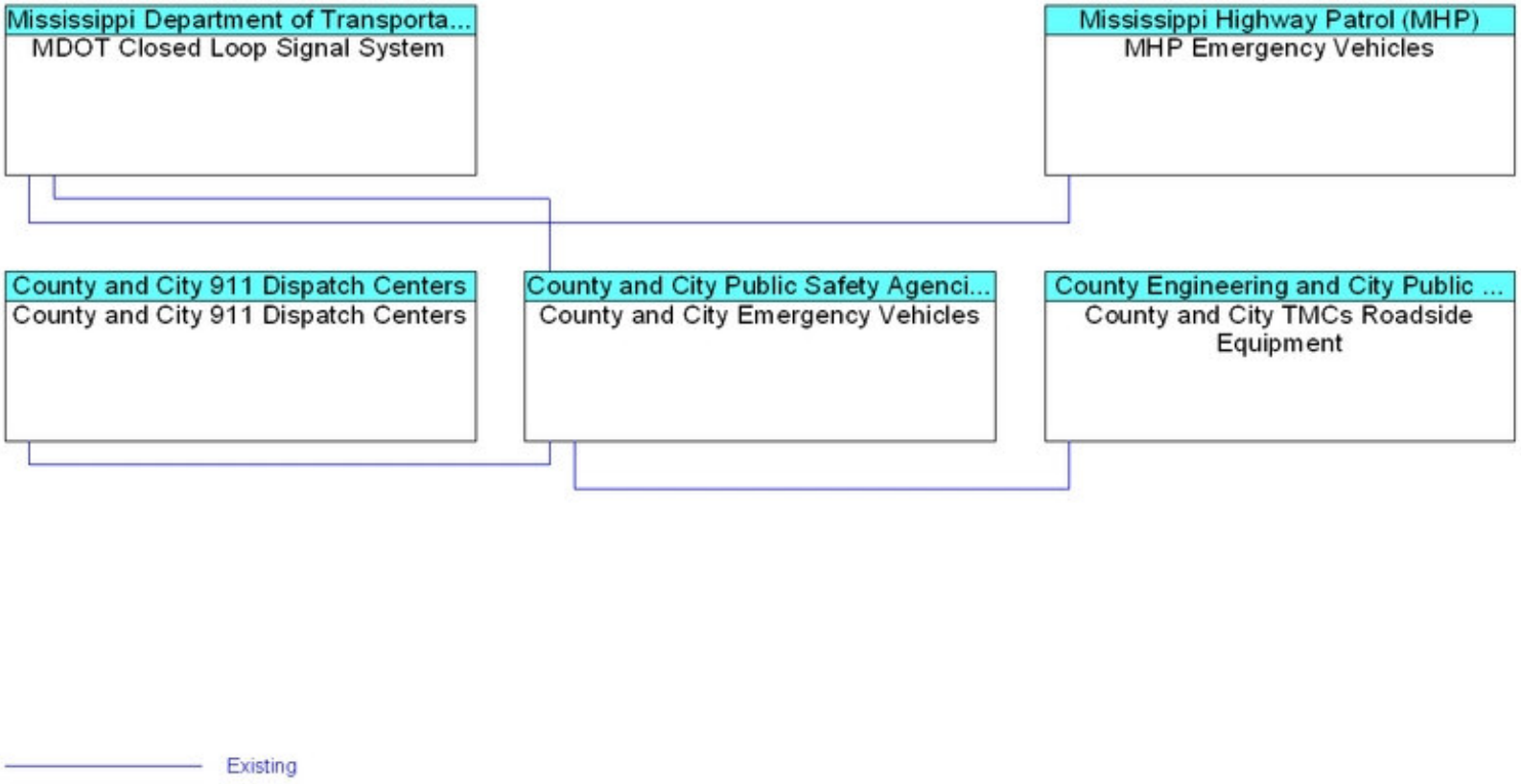
County and City 911 Dispatch Centers
County Emergency Management Age...
County Emergency Operations Centers
Transit Service Providers
Multimodal Transit Centers
Mississippi Department of Environme...
Mississippi Department of Environmental Quality
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Mississippi Highway Patrol (MHP)
MHP Central and District Offices
Emergency Telecommunications System
Urban Transit Agencies
Urban Transit Systems
County and City Public Safety Agenci...
County and City Emergency Vehicles
Neighboring States
Neighboring State Highway Patrol Dispatch Centers
Rural Transit Agencies
Rural Transit Systems
Mississippi Highway Patrol (MHP)
MHP *HP Cellular Phone System
Mississippi Highway Patrol (MHP)
MHP Emergency Vehicles
Existing
Planned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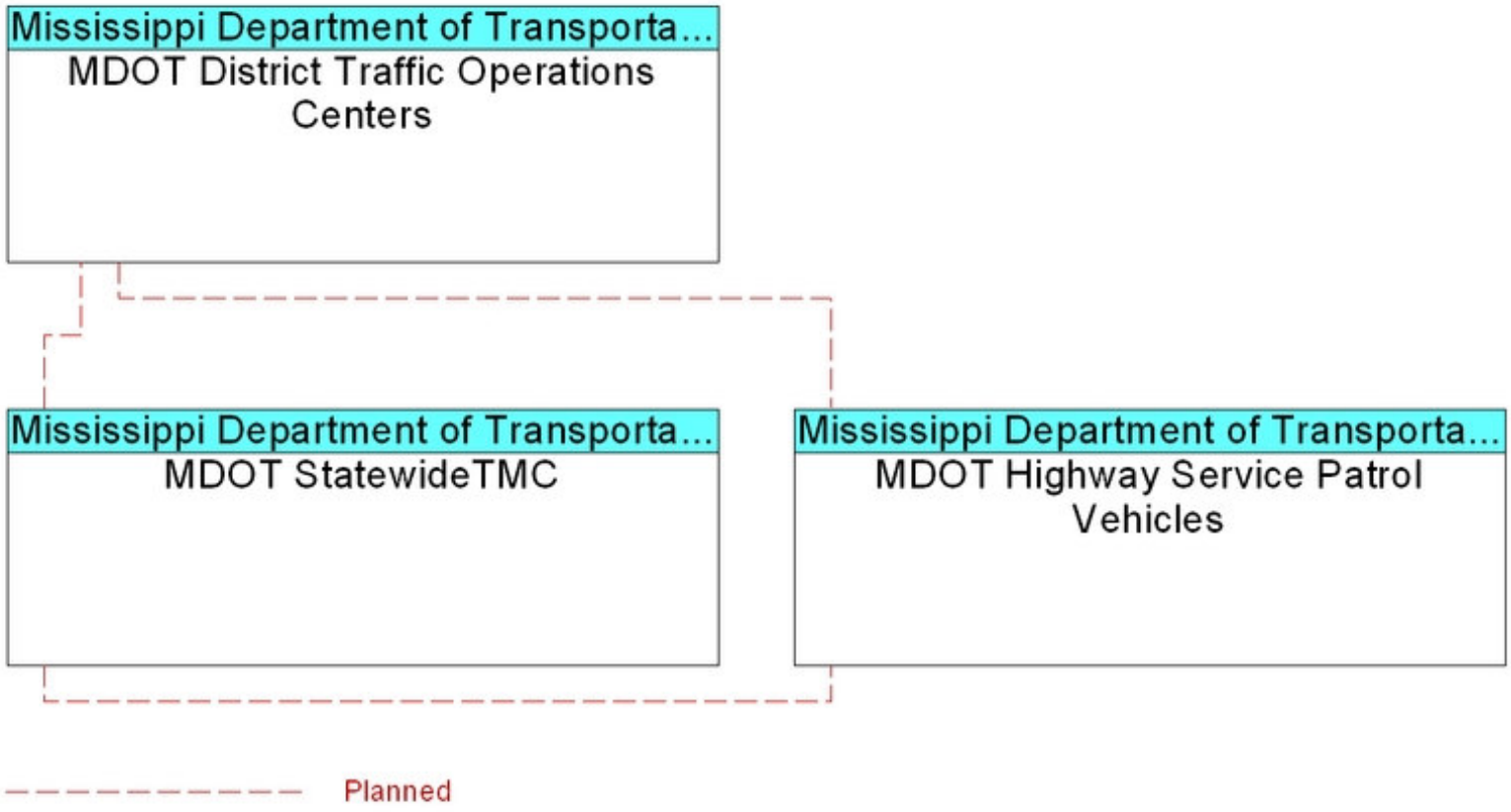
MDOT Closed Loop Signal System
Mississippi Highway Patrol (MHP)
MHP Emergency Vehicles
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
County and City Public Safety Agenci...
County and City Emergency Vehicles
County Engineering and City Public ...
County and City TMCs Roadside Equipment
Existing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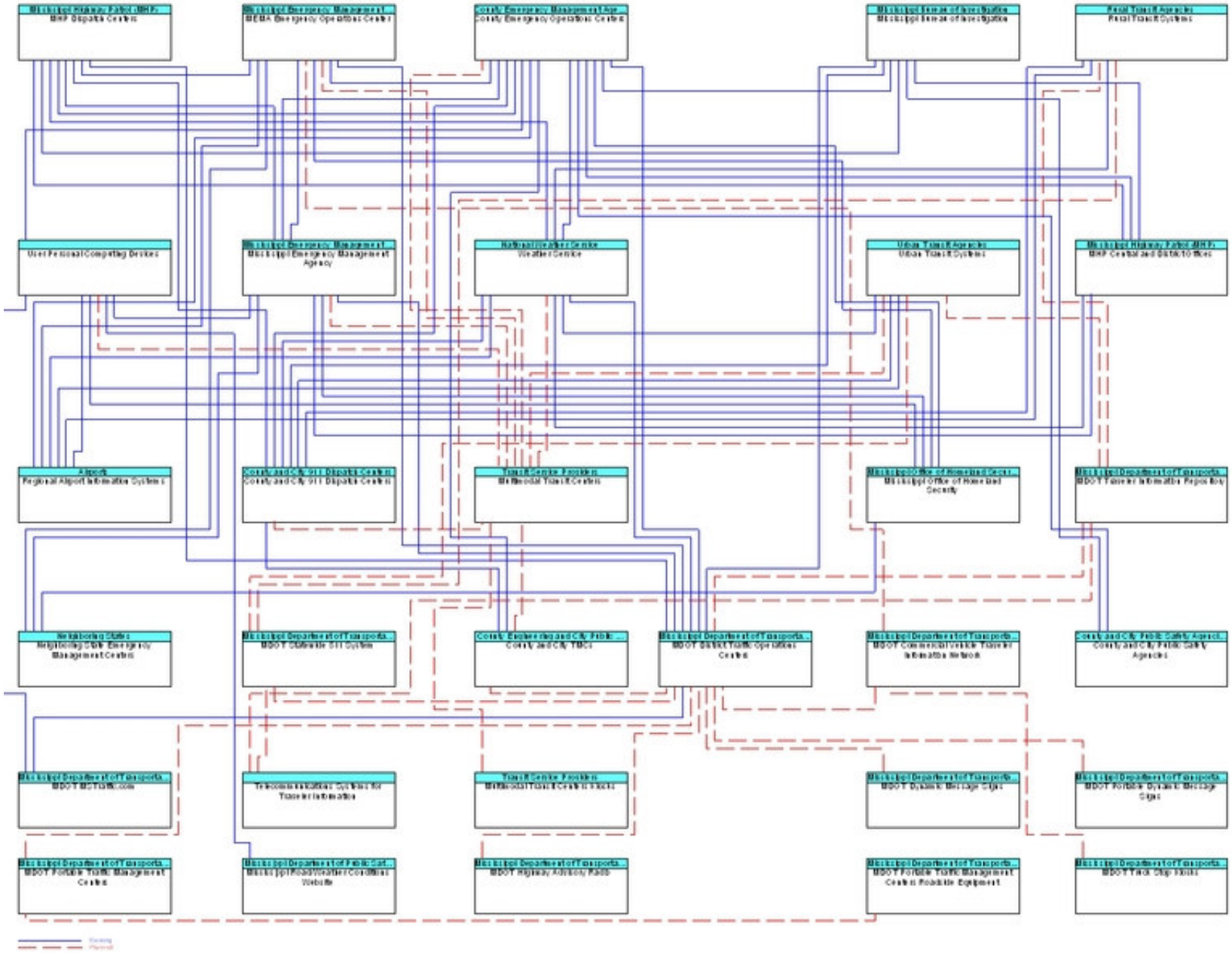
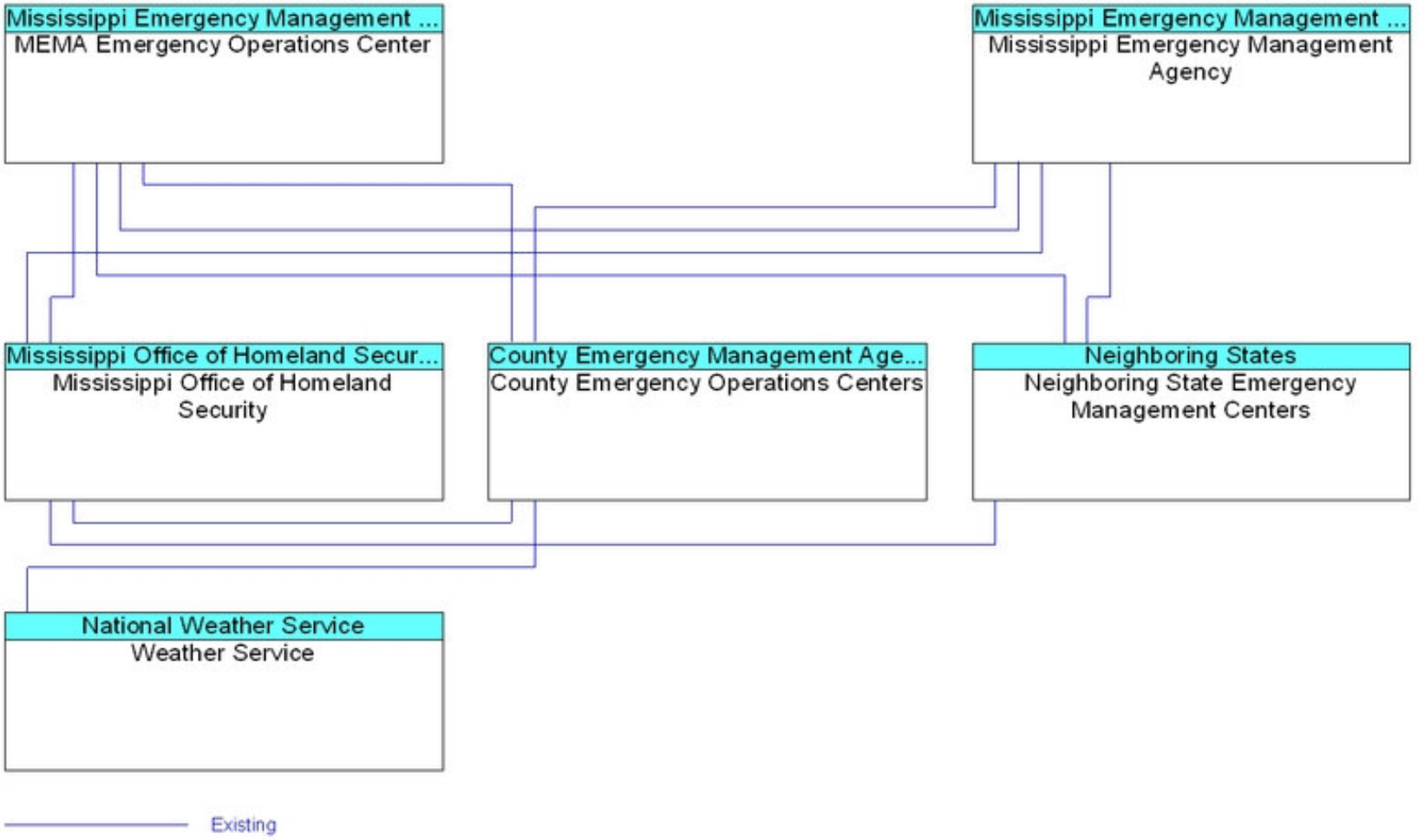
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Highway Service Patrol Vehicles
Planned

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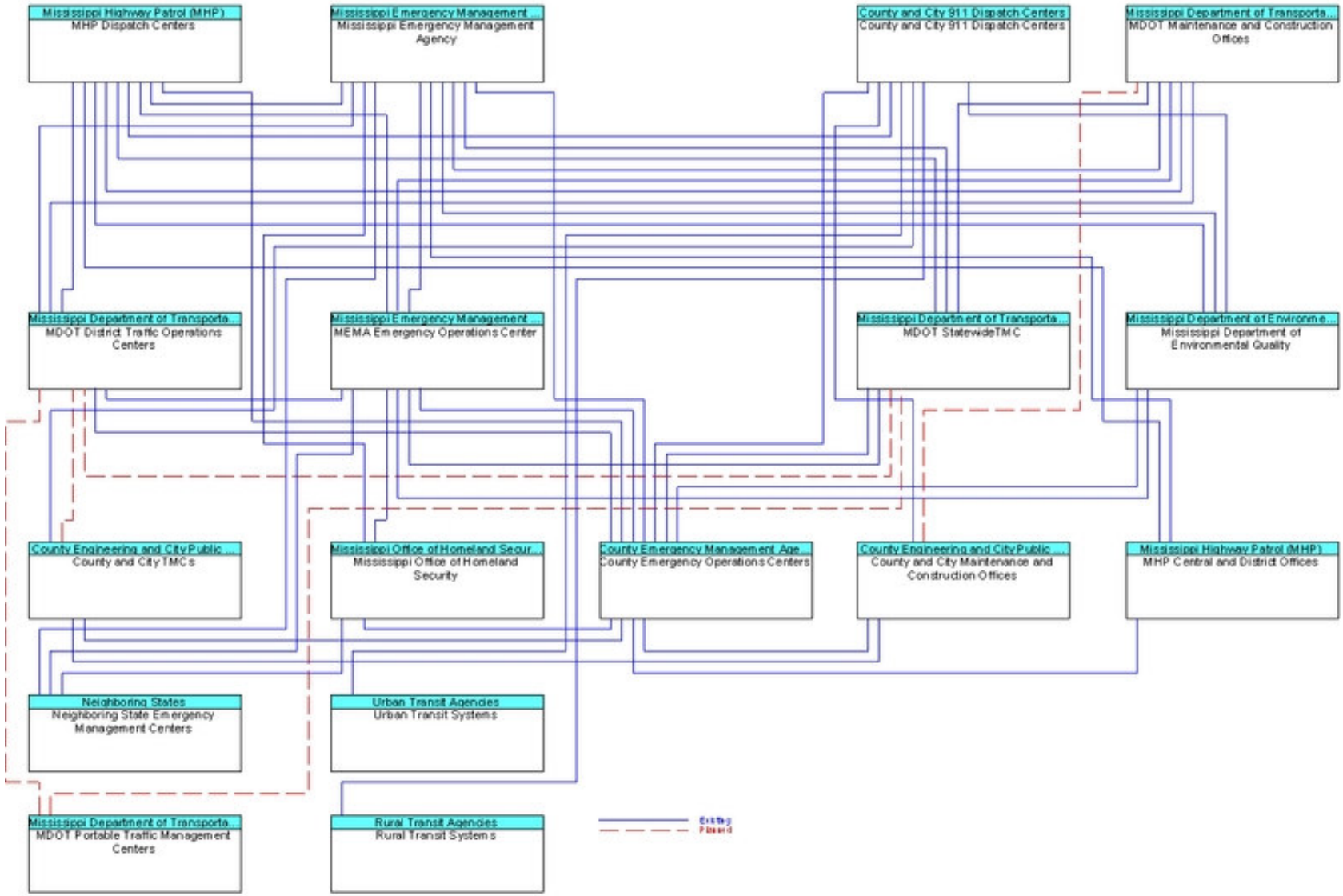
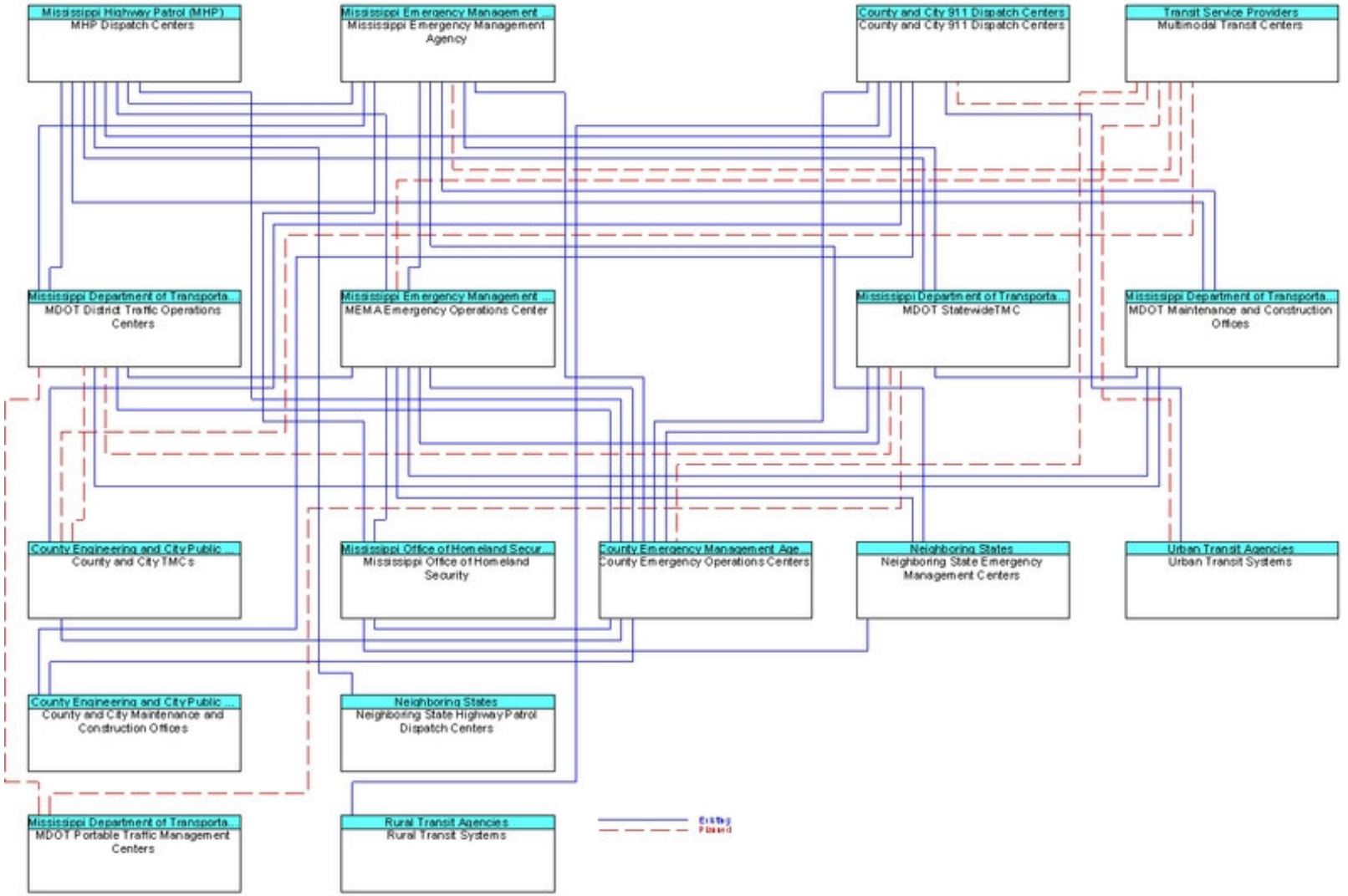
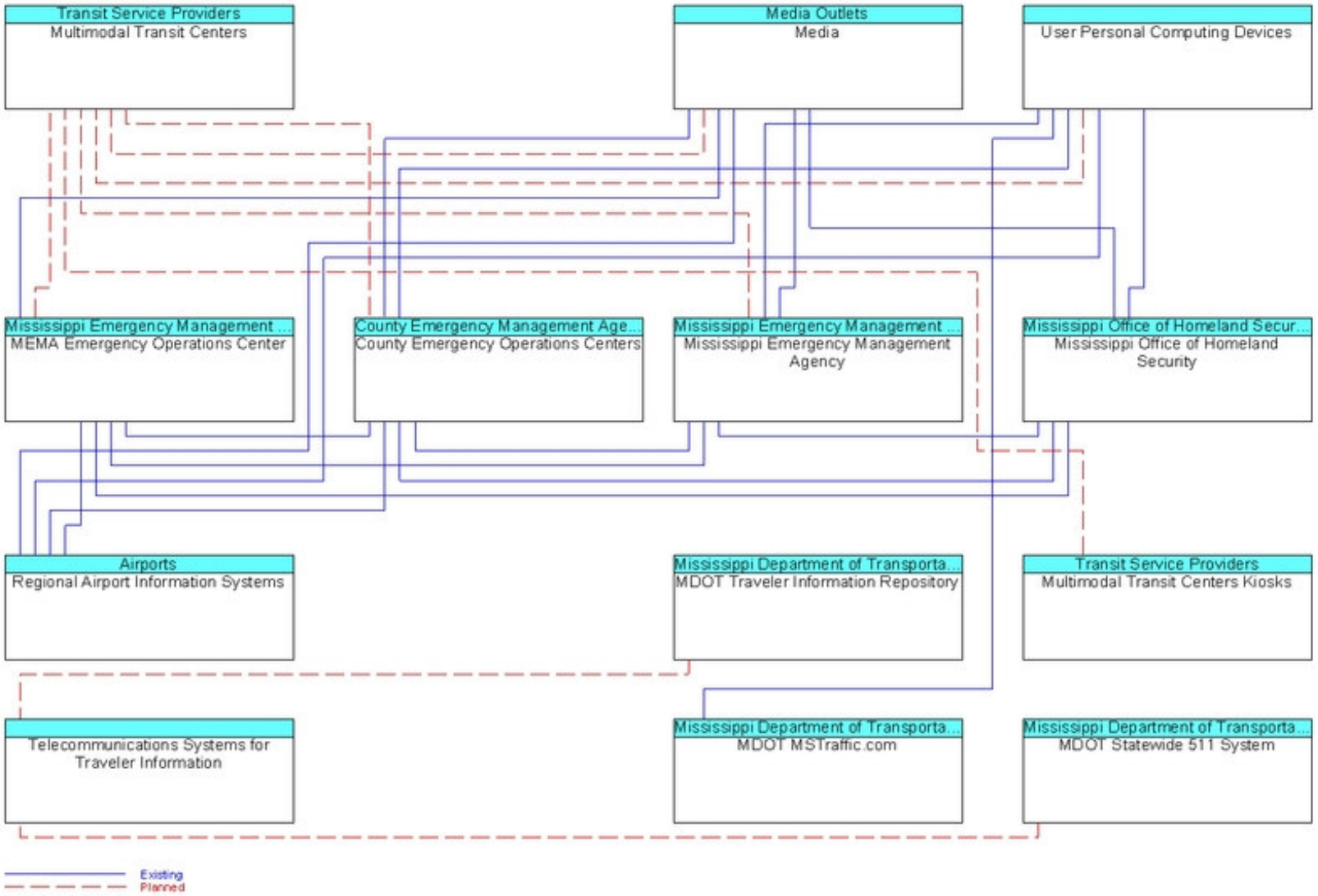
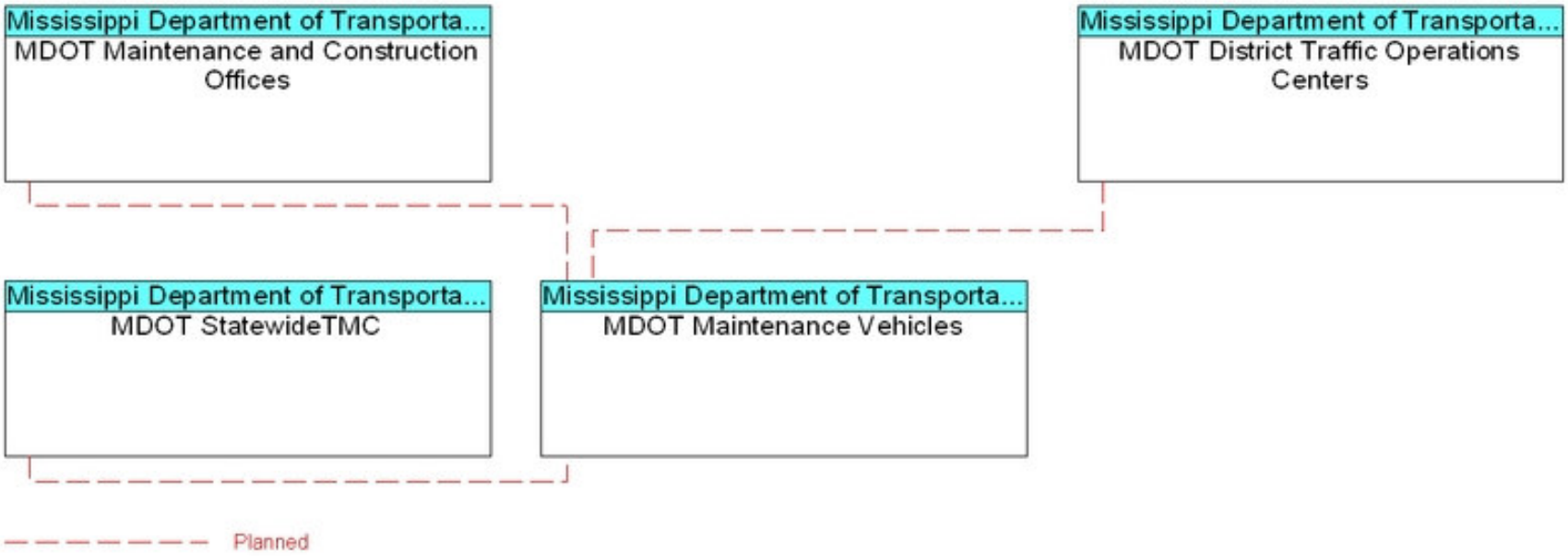
MEMA Emergency Operations Center
Mississippi Emergency Management ...
Mississippi Emergency Management Agency
Mississippi Office of Homeland Secur...
Mississippi Office of Homeland Security
County Emergency Management Age...
County Emergency Operations Centers
Neighboring States
Neighboring State Emergency Management Centers
National Weather Service
Weather Service
Existing


Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Mississippi Emergency Management ...
Mississippi Emergency Management Agency
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Emergency Management ...
MEMA Emergency Operations Center
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Environme...
Mississippi Department of Environmental Quality
County Engineering and City Public ...
County and City TMCs
Mississippi Office of Homeland Secur...
Mississippi Office of Homeland Security
County Emergency Management Age...
County Emergency Operations Centers
County Engineering and City Public ...
County and City Maintenance and Construction Offices
Mississippi Highway Patrol (MHP)
MHP Central and District Offices
Neighboring States
Neighboring State Emergency Management Centers
Urban Transit Agencies
Urban Transit Systems
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Rural Transit Agencies
Rural Transit Systems


Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Mississippi Emergency Management ...
Mississippi Emergency Management Agency
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
Transit Service Providers
Multimodal Transit Centers
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Emergency Management ...
MEMA Emergency Operations Center
Mississippi Department of Transporta...
MDOT Statewide TMC
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
County Engineering and City Public ...
County and City TMCs
Mississippi Office of Homeland Secur...
Mississippi Office of Homeland Security
County Emergency Management Age...
County Emergency Operations Centers
Neighboring States
Neighboring State Emergency Management Centers
Urban Transit Agencies
Urban Transit Systems
County Engineering and City Public ...
County and City Maintenance and Construction Offices
Neighboring States
Neighboring State Highway Patrol Dispatch Centers
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Rural Transit Agencies
Rural Transit Systems
Existing
Planned


Transit Service Providers
Multimodal Transit Centers
Media Outlets
Media
User Personal Computing Devices
Mississippi Emergency Management ...
MEMA Emergency Operations Center
County Emergency Management Age...
County Emergency Operations Centers
Mississippi Emergency Management ...
Mississippi Emergency Management Agency
Mississippi Office of Homeland Secur...
Mississippi Office of Homeland Security
Airports
Regional Airport Information Systems
Mississippi Department of Transporta...
MDOT Traveler Information Repository
Transit Service Providers
Multimodal Transit Centers Kiosks
Telecommunications Systems for Traveler Information
Mississippi Department of Transporta...
MDOT MSTraffic.com
Mississippi Department of Transporta...
MDOT Statewide 511 System
Existing
Planned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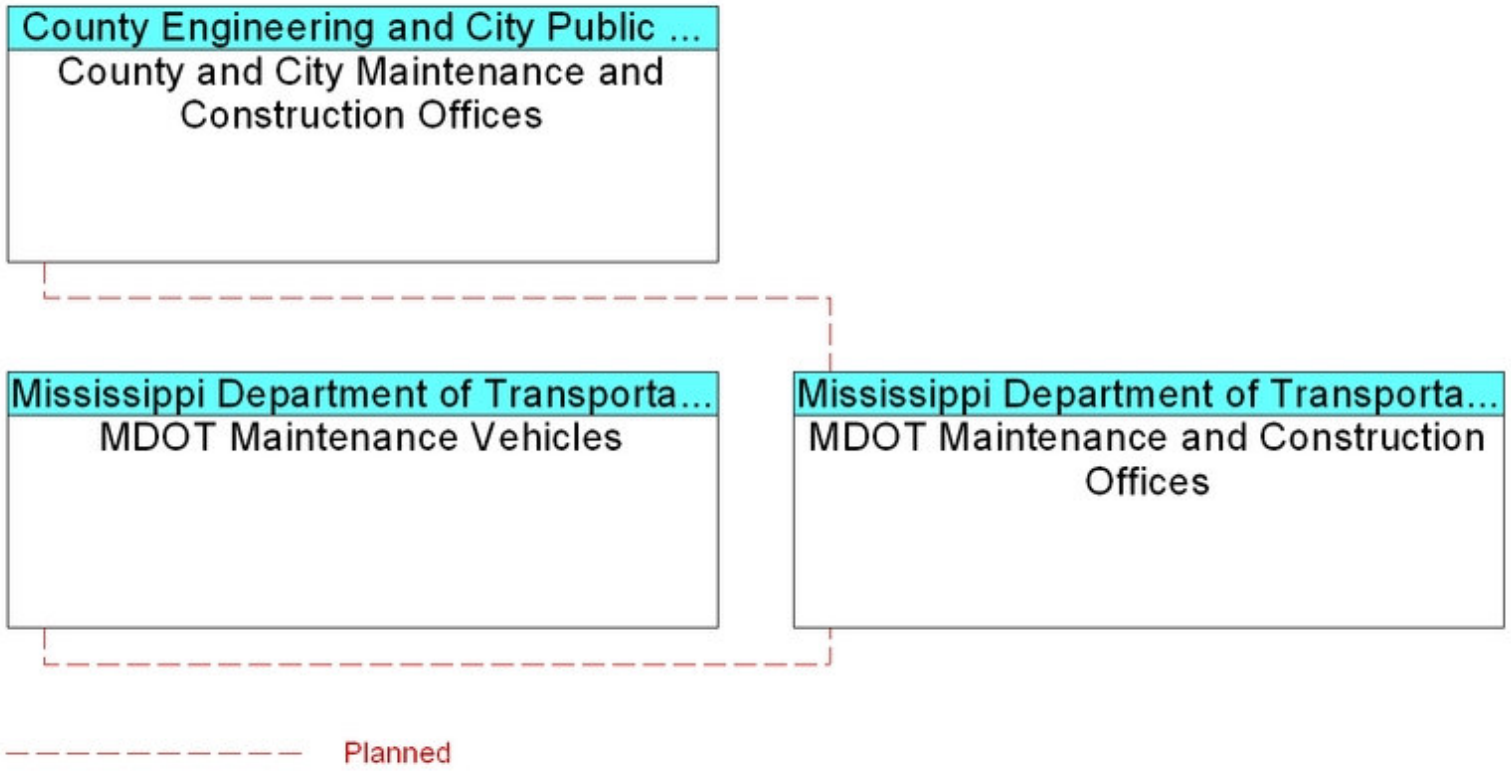
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
Planned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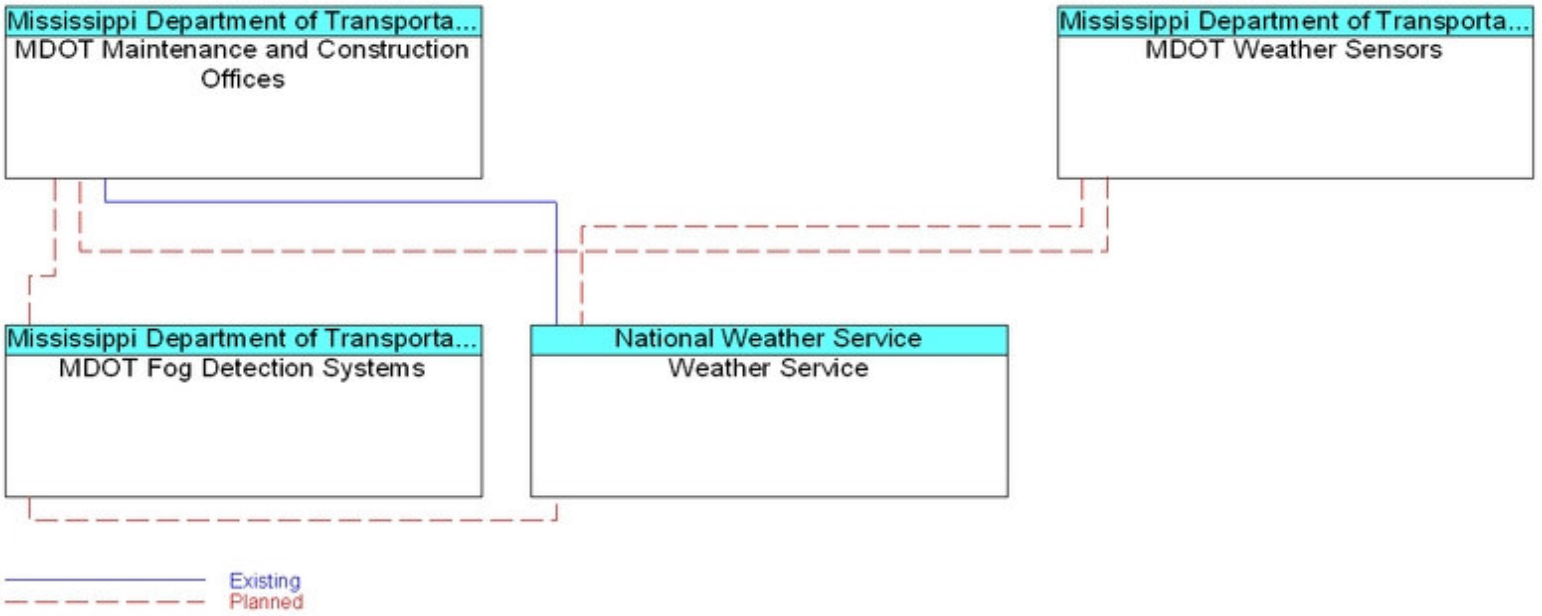
County and City Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Planned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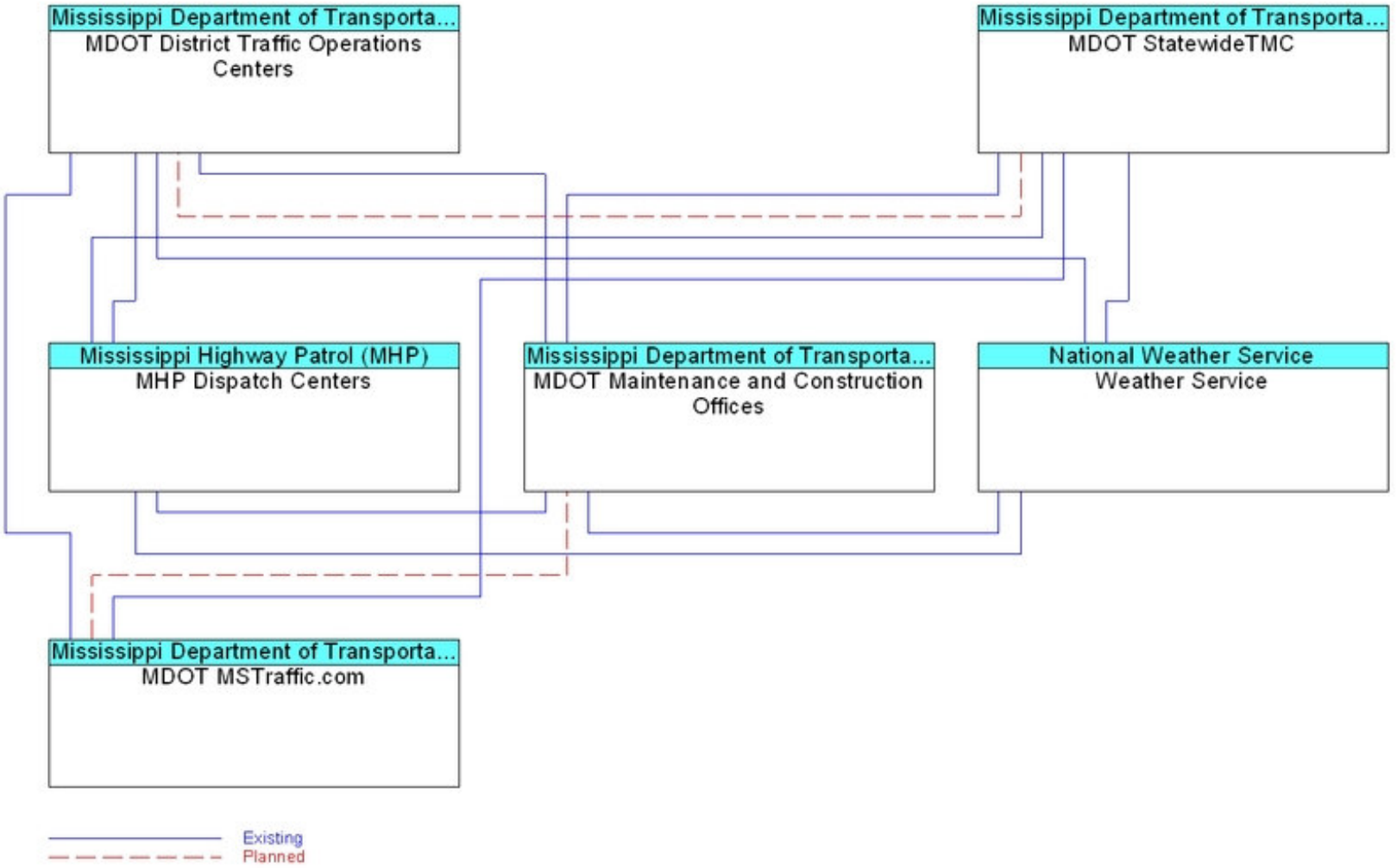
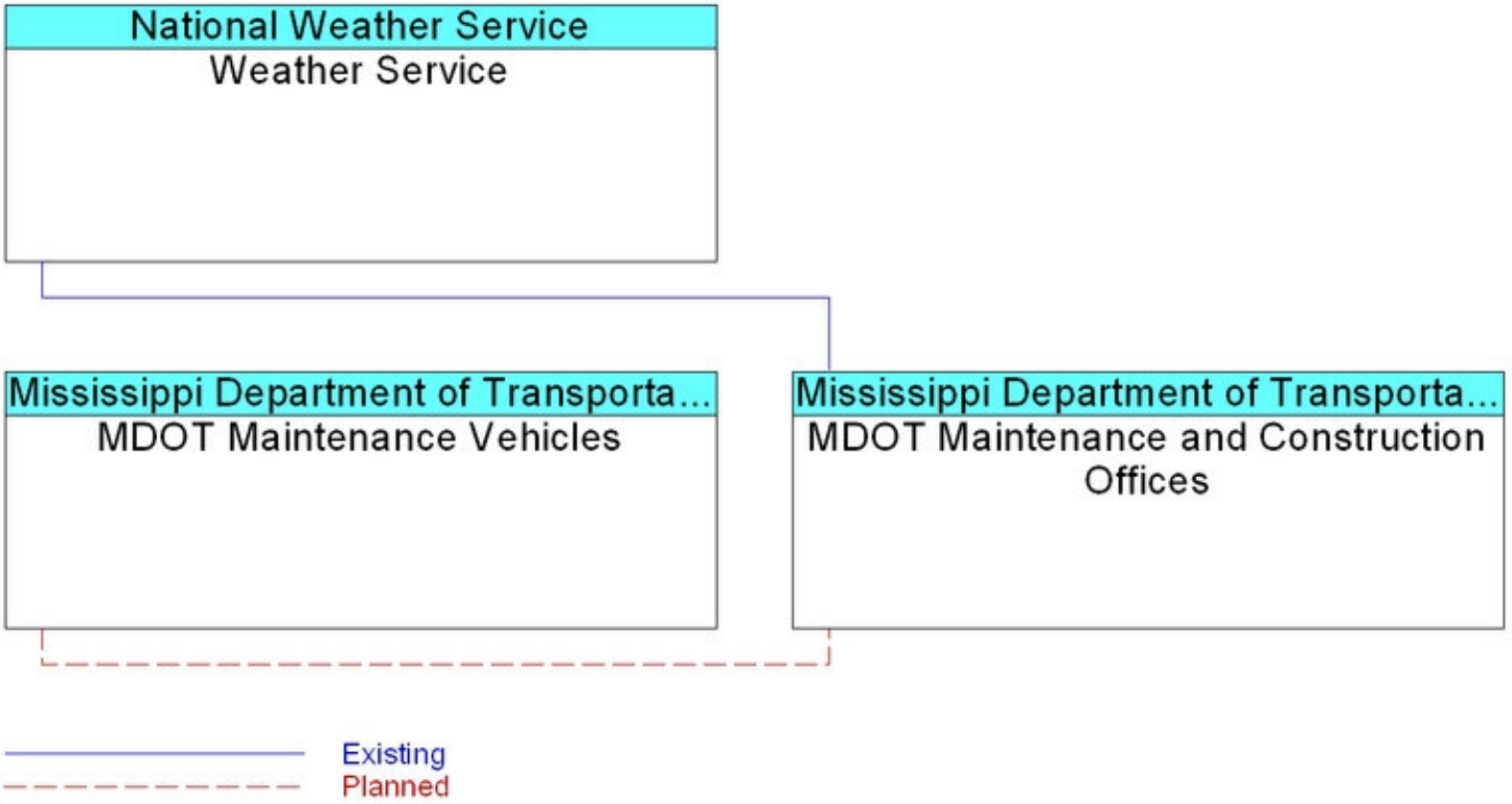
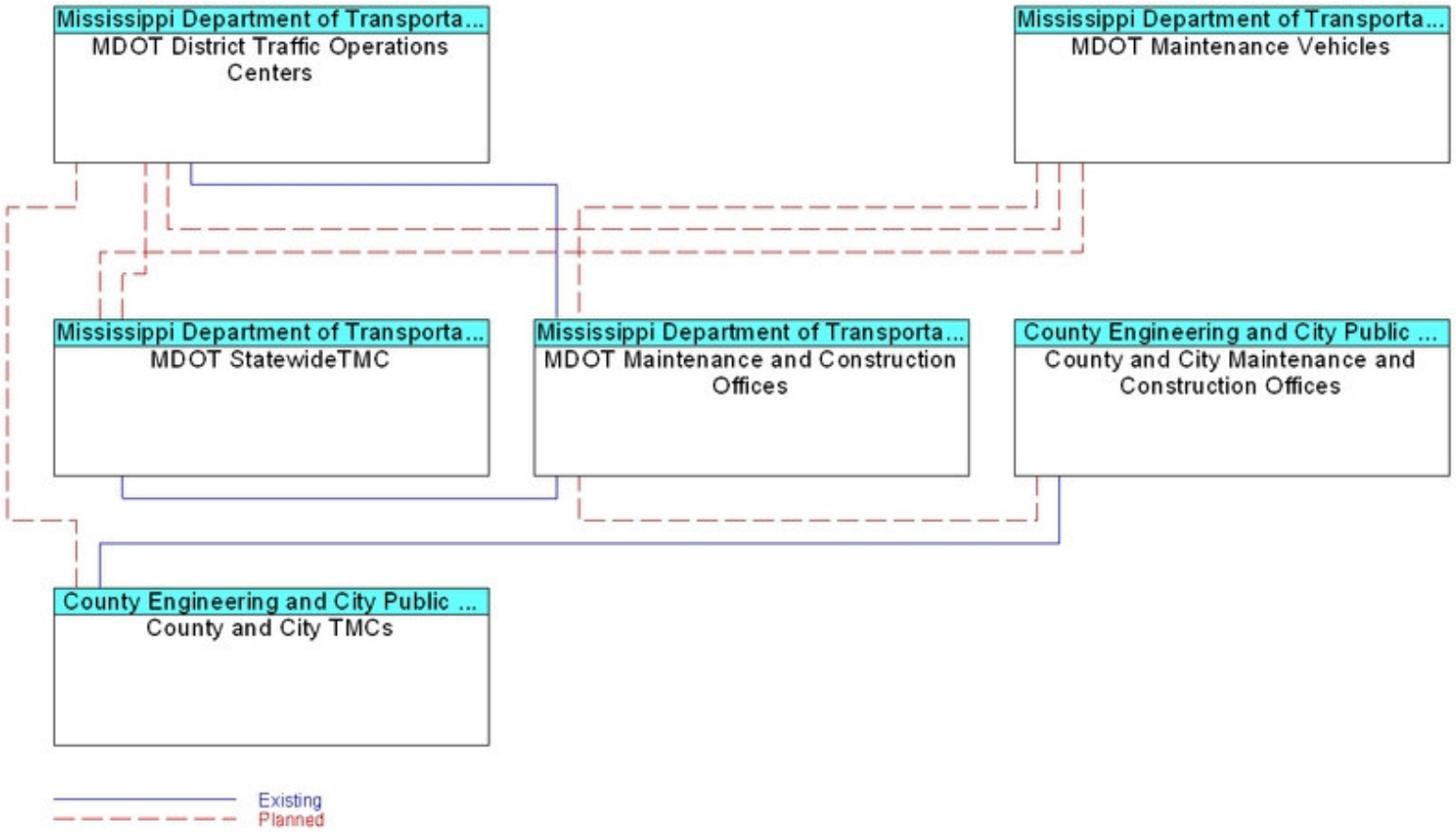
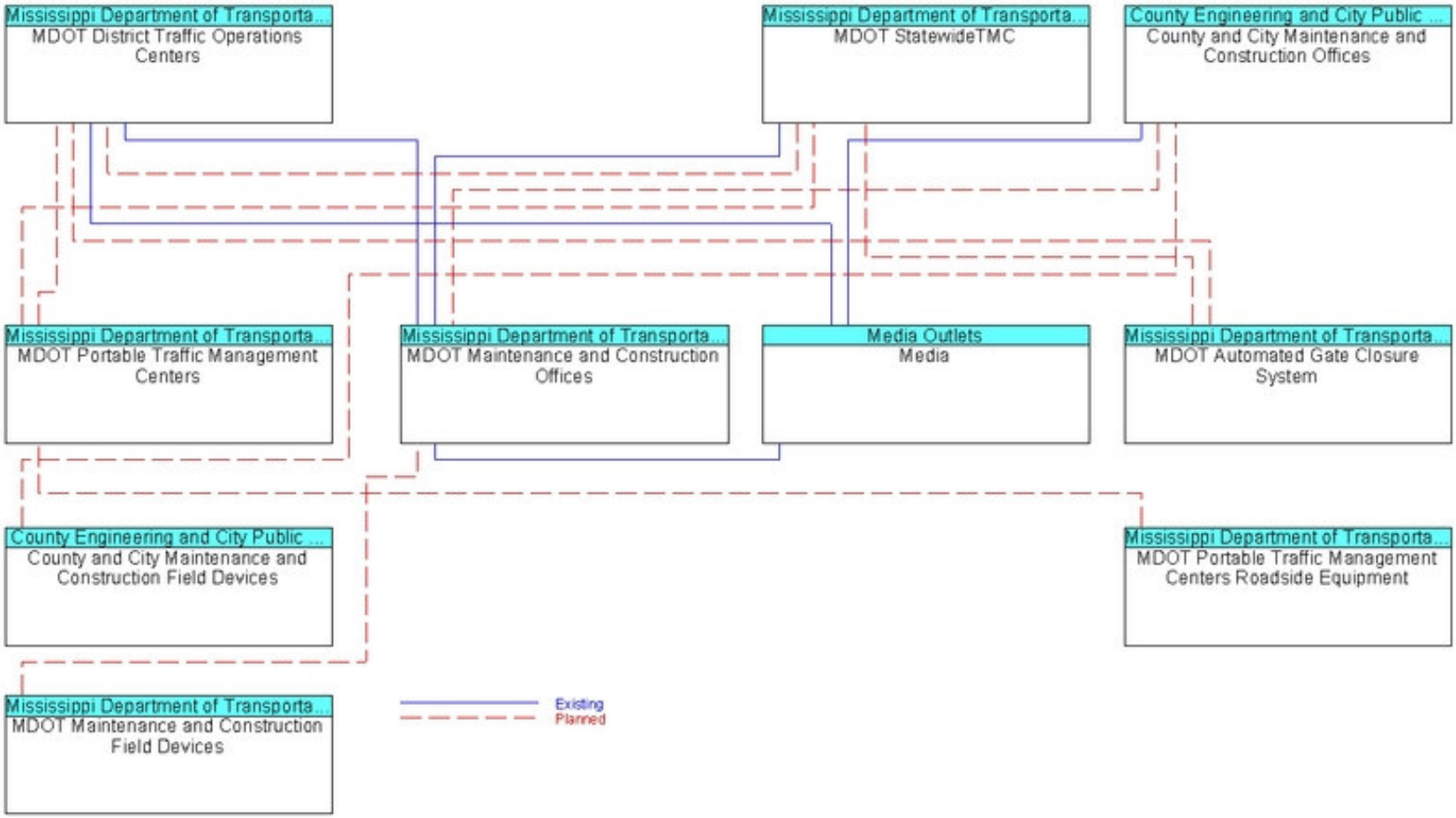
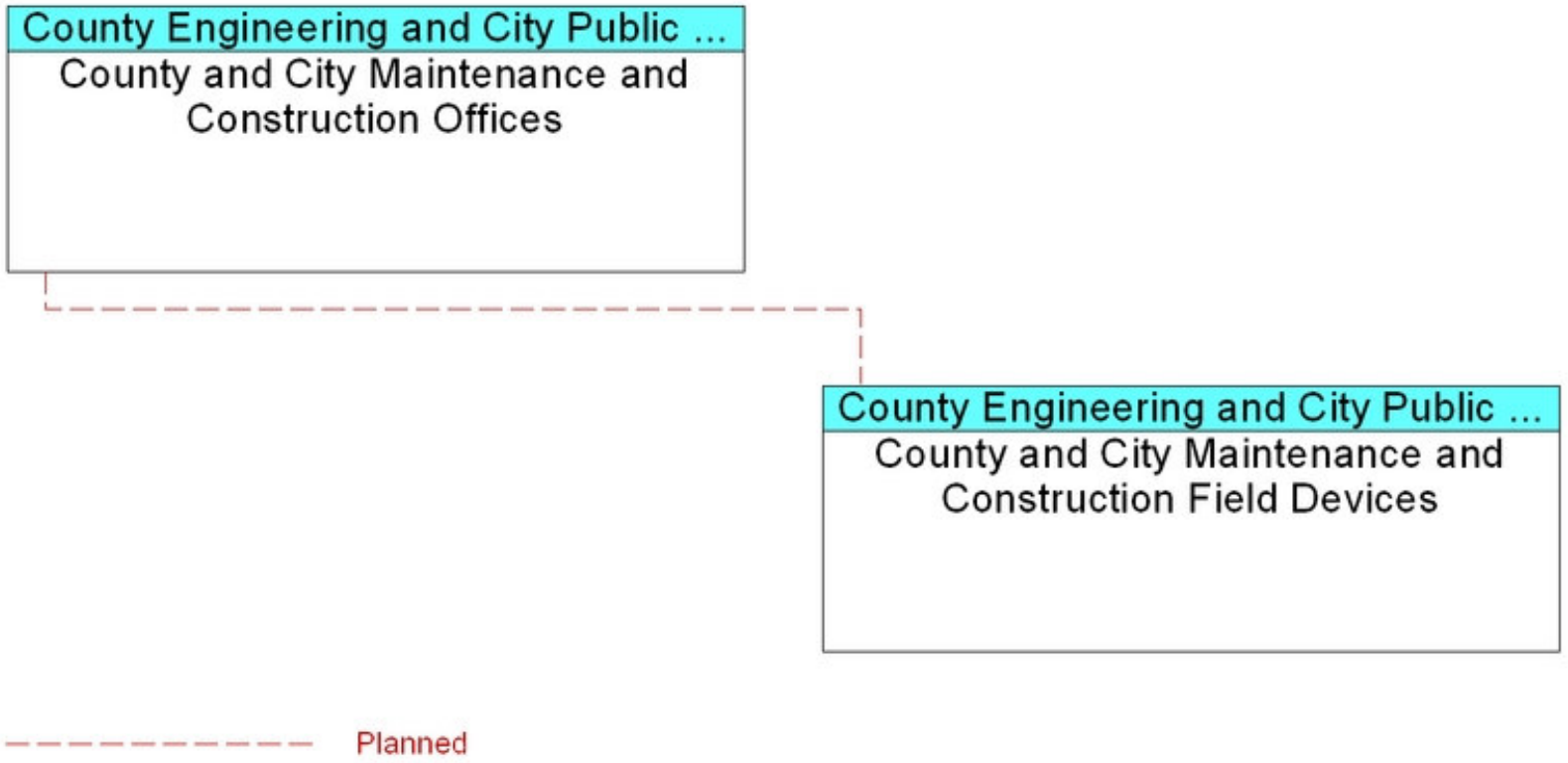
Mississippi Department of Transporta...
MDOT Weather Sensors
Mississippi Department of Transporta...
MDOT Fog Detection Systems
National Weather Service
Weather Service
Existing
Planned


Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
National Weather Service
Weather Service
Mississippi Department of Transporta...
MDOT MSTraffic.com
Existing
Planned


National Weather Service
Weather Service
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Existing
Planned


Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
County Engineering and City Public ...
County and City Maintenance and Construction Offices
County Engineering and City Public ...
County and City TMCs
Existing
Planned


Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
County Engineering and City Public ...
County and City Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Media Outlets
Media
Mississippi Department of Transporta...
MDOT Automated Gate Closure System
County Engineering and City Public ...
County and City Maintenance and Construction Field Devices
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
Mississippi Department of Transporta...
MDOT Maintenance and Construction Field Devices
Existing
Planned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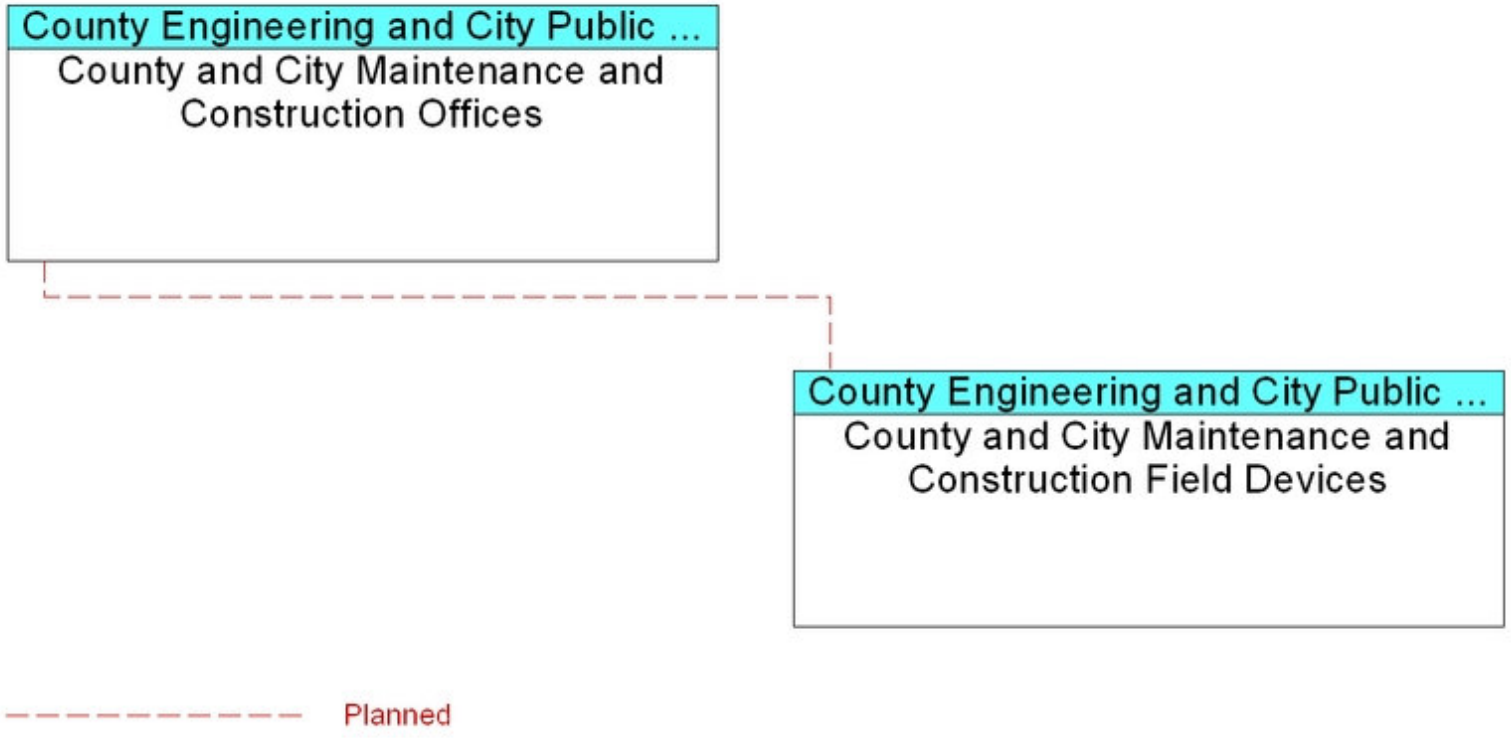
County and City Maintenance and Construction Offices
County Engineering and City Public ...
County and City Maintenance and Construction Field Devices
Planned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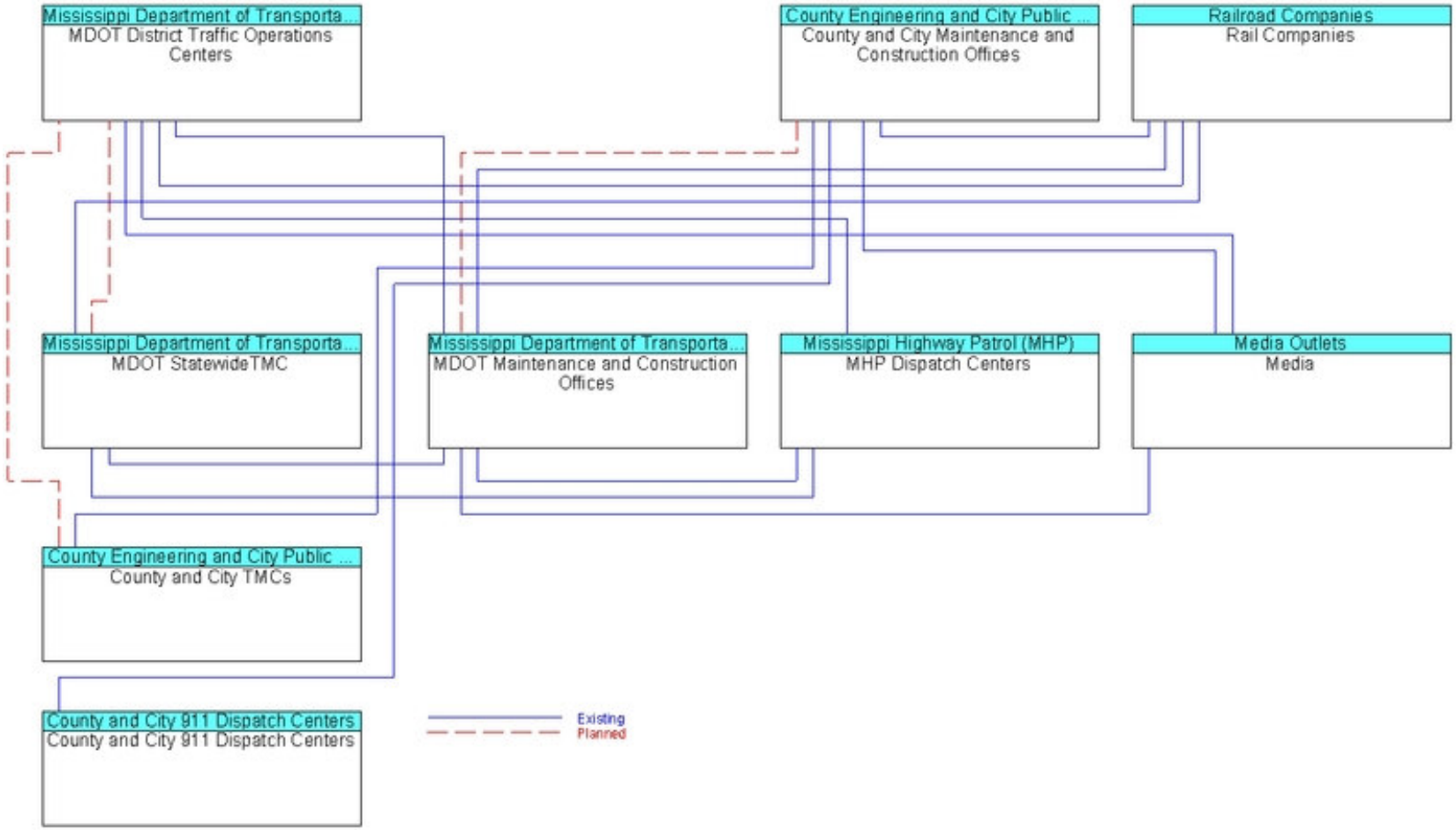
County and City Maintenance and Construction Offices
County Engineering and City Public ...
County and City Maintenance and Construction Field Devices
Planned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County Engineering and City Public ...
County and City Maintenance and Construction Offices
Railroad Companies
Rail Companies
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Media Outlets
Media
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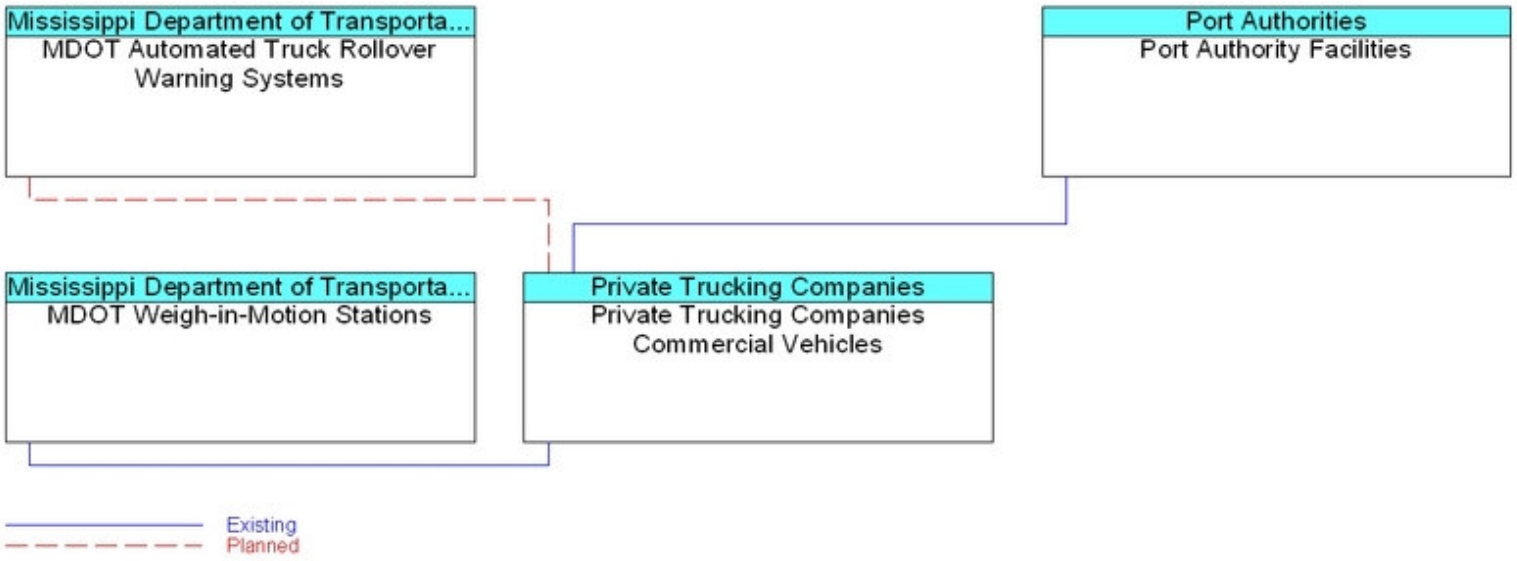
County and City TMCs
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
Existing
Planned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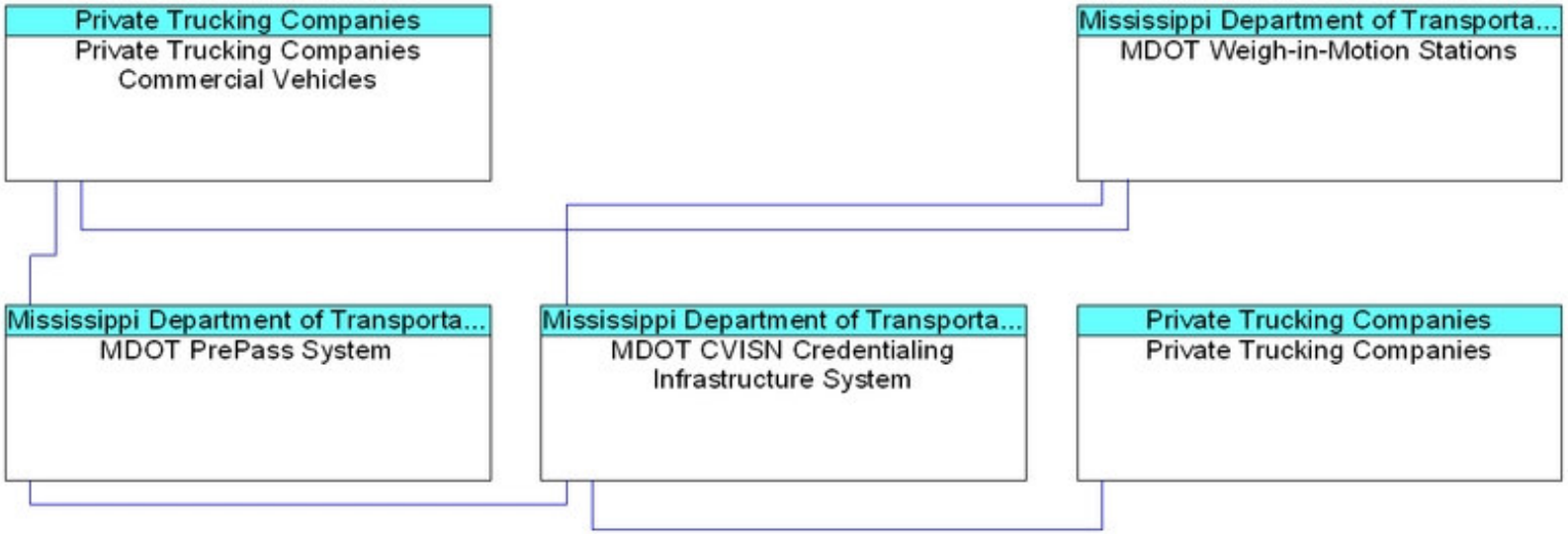
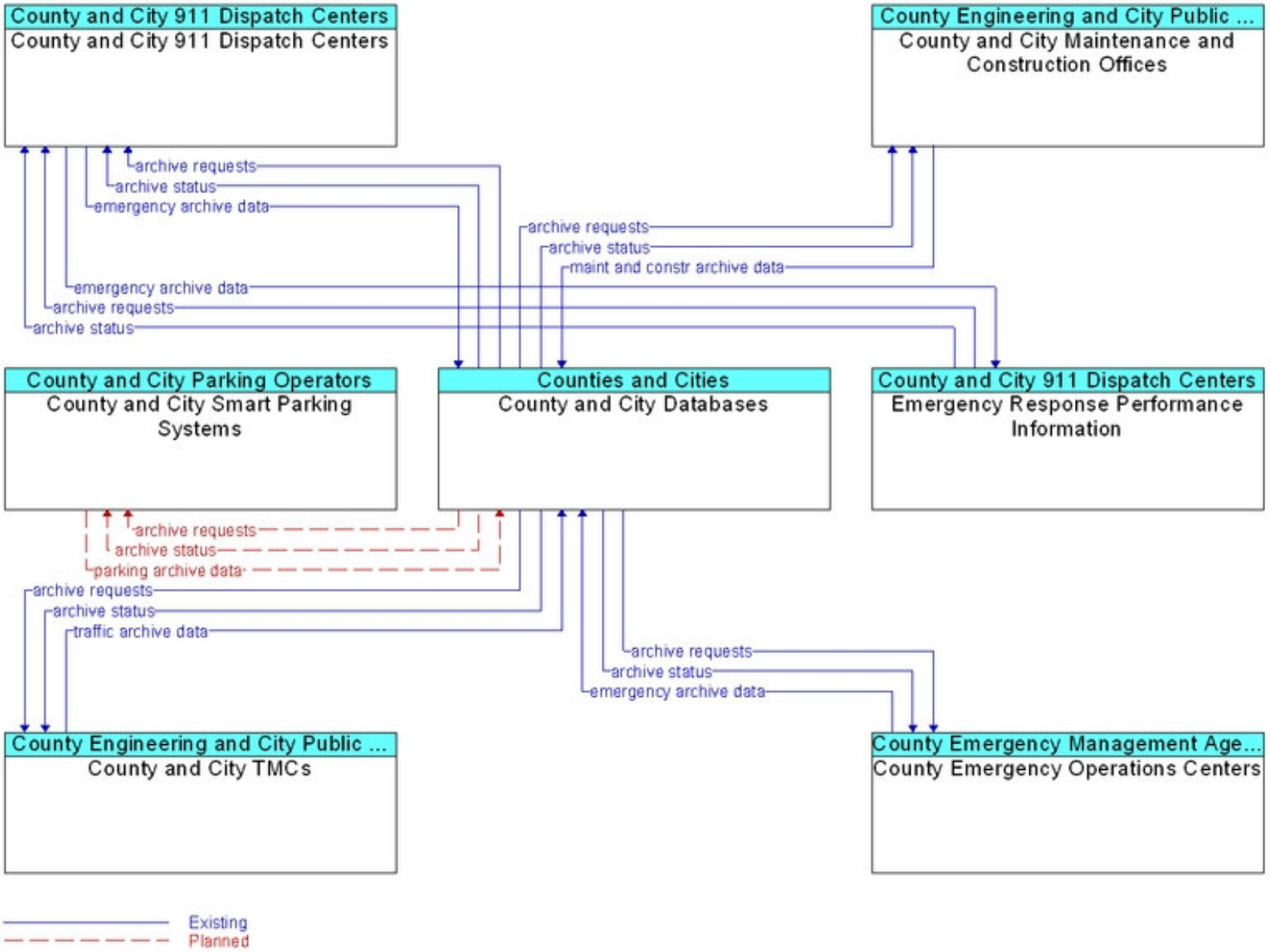
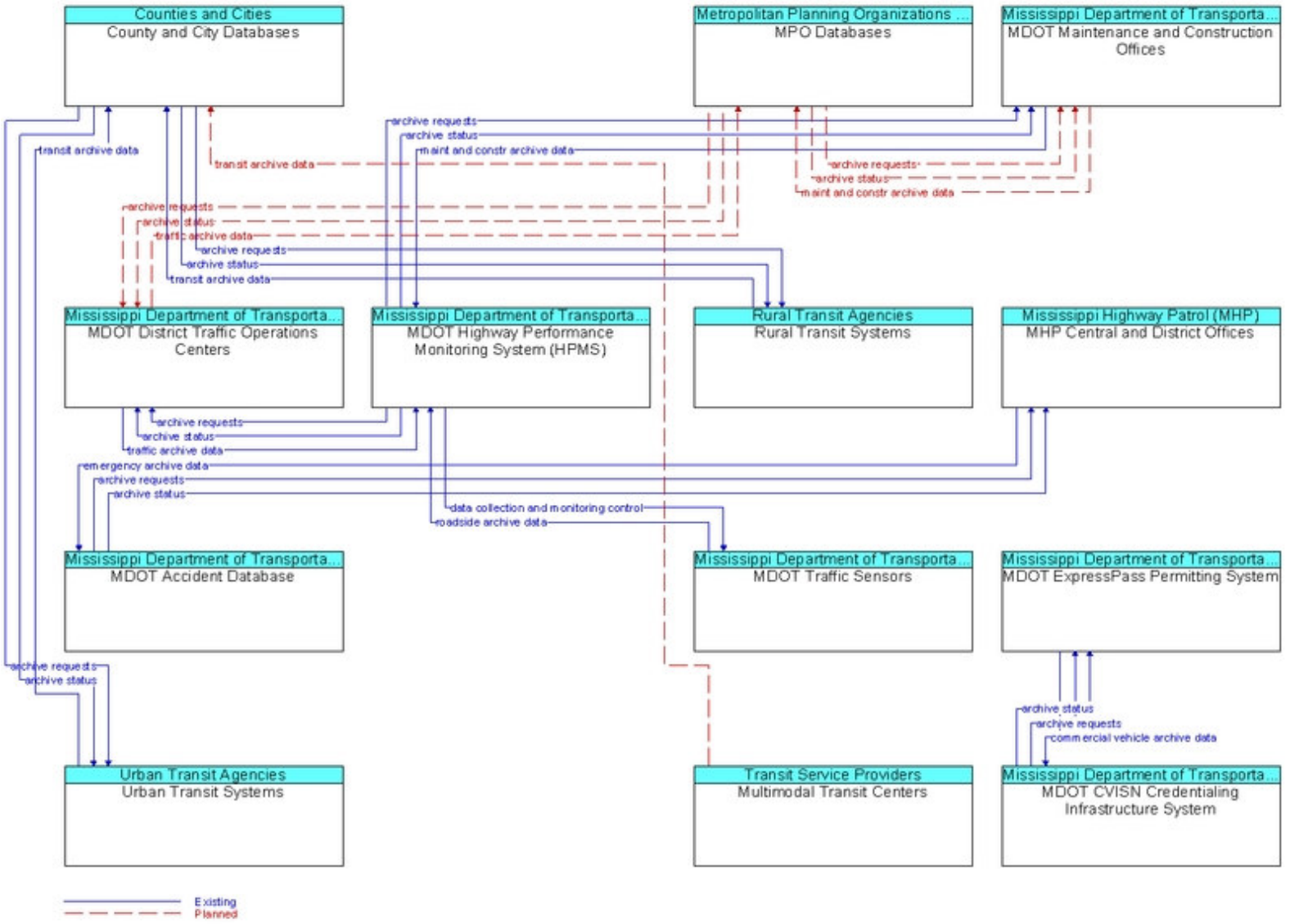
Port Authorities
Port Authority Facilities
Mississippi Department of Transporta...
MDOT Weigh-in-Motion Stations
Private Trucking Companies
Private Trucking Companies Commercial Vehicles
Existing
Planned


Private Trucking Companies
Private Trucking Companies
Commercial Vehicles
Mississippi Department of Transporta...
MDOT Weigh-in-Motion Stations
Mississippi Department of Transporta...
MDOT PrePass System
Mississippi Department of Transporta...
MDOT CVISN Credentialing
Infrastructure System
Private Trucking Companies
Private Trucking Companies
Existing

Appendix D: Architecture Flows

NOTE: Because of the large amount of data that can flow between different elements, many of the diagrams generated by Turbo Architecture are illegible. Detailed information on these diagrams can be found in the "Flows" section of the "Interfaces" tab within Turbo. It is here that data flows can be seen between origin and destination elements.


County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
County Engineering and City Public ...
County and City Maintenance and Construction Offices
archive requests
archive status
emergency archive data
archive requests
archive status
maint and constr archive data
emergency archive data
archive requests
archive status
County and City Parking Operators
County and City Smart Parking Systems
Counties and Cities
County and City Databases
County and City 911 Dispatch Centers
Emergency Response Performance Information
archive requests
archive status
parking archive data
archive requests
archive status
traffic archive data
archive requests
archive status
emergency archive data
County Engineering and City Public ...
County and City TMCs
County Emergency Management Age...
County Emergency Operations Centers
Existing
Planned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County and City Databases
Metropolitan Planning Organizations ...
MPO Databases
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
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archive requests
archive status
maint and constr archive data
transit archive data
archive requests
archive status
maint and constr archive data
archive requests
archive status
traffic archive data
archive requests
archive status
transit archive data
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Highway Performance Monitoring System (HPMS)
Rural Transit Agencies
Rural Transit Systems
Mississippi Highway Patrol (MHP)
MHP Central and District Offices
archive requests
archive status
traffic archive data
emergency archive data
archive requests
archive status
data collection and monitoring control
roadside archive data
Mississippi Department of Transporta...
MDOT Accident Database
Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transporta...
MDOT ExpressPass Permitting System
archive requests
archive status
archive status
archive requests
commercial vehicle archive data
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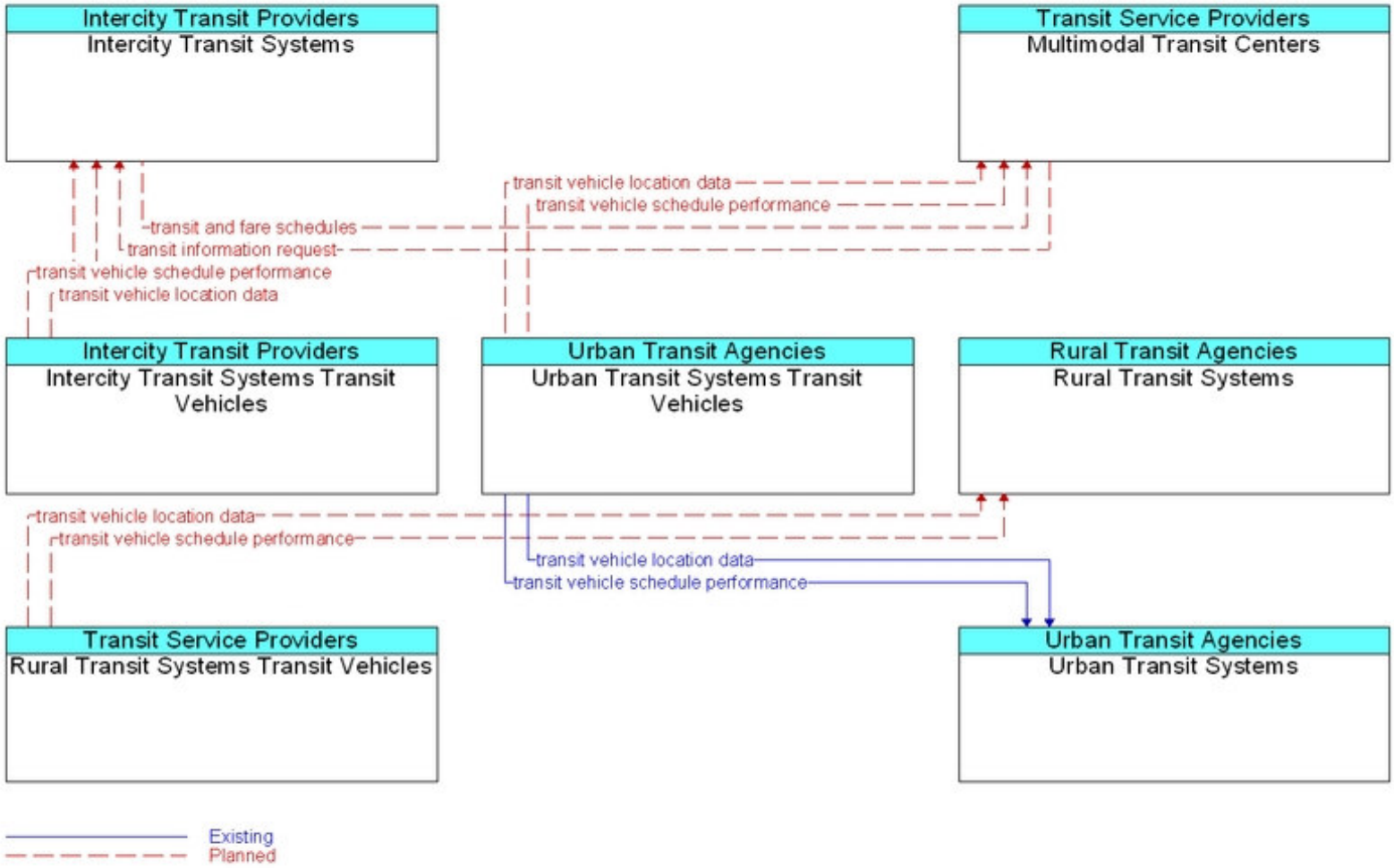
Urban Transit Systems
Transit Service Providers
Multimodal Transit Centers
Mississippi Department of Transporta...
MDOT CVISN Credentialing Infrastructure System
Existing
Planned


Intercity Transit Providers
Intercity Transit Systems
Transit Service Providers
Multimodal Transit Centers
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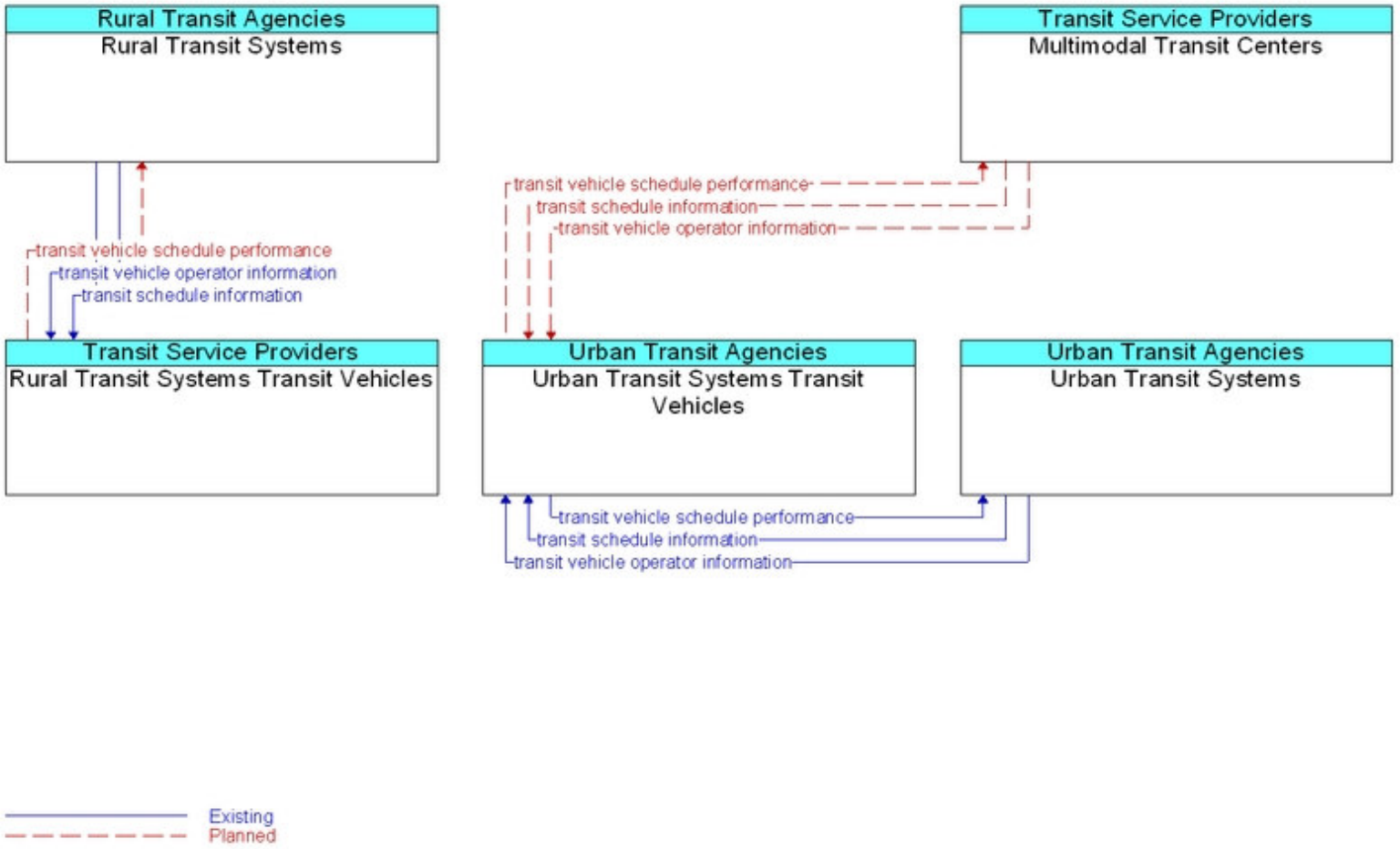
transit vehicle schedule performance
transit and fare schedules
transit information request
transit vehicle schedule performance
transit vehicle location data
Intercity Transit Providers
Intercity Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Rural Transit Agencies
Rural Transit Systems
transit vehicle location data
transit vehicle schedule performance
transit vehicle location data
transit vehicle schedule performance
Transit Service Providers
Rural Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems
Existing
Planned


Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Multimodal Transit Centers
transit vehicle schedule performance
transit schedule information
transit vehicle operator information
transit vehicle schedule performance
transit vehicle operator information
transit schedule information
Transit Service Providers
Rural Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems
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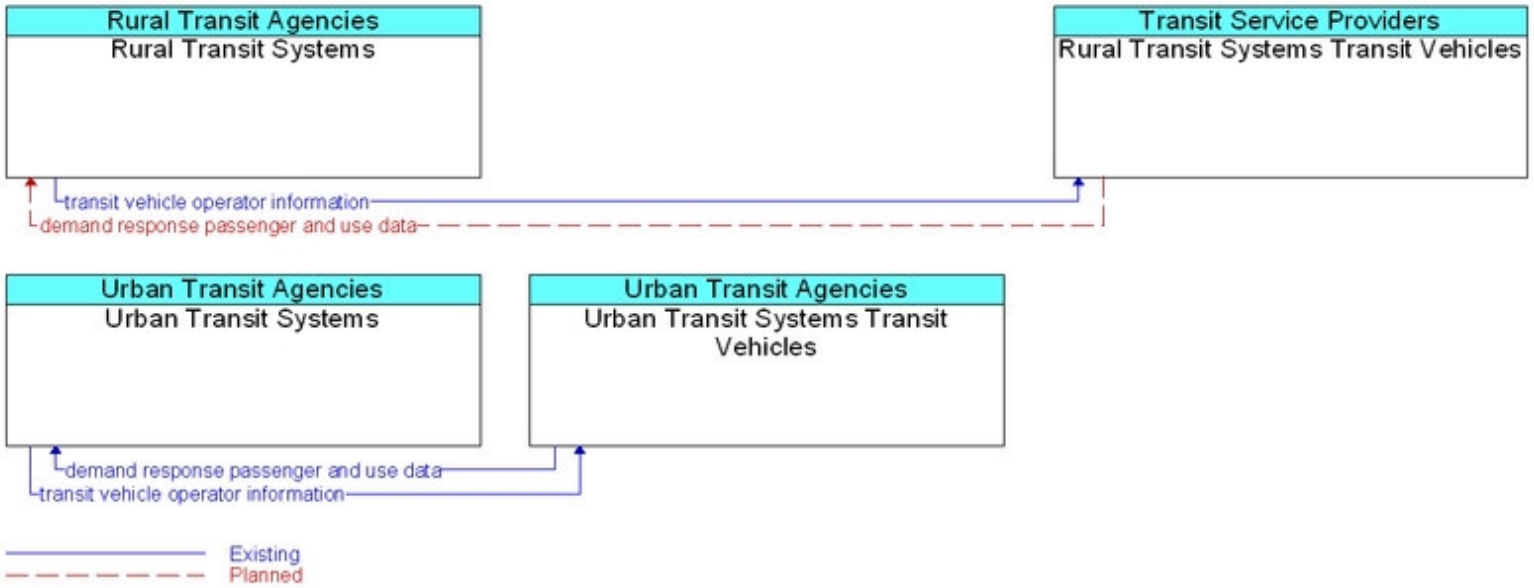
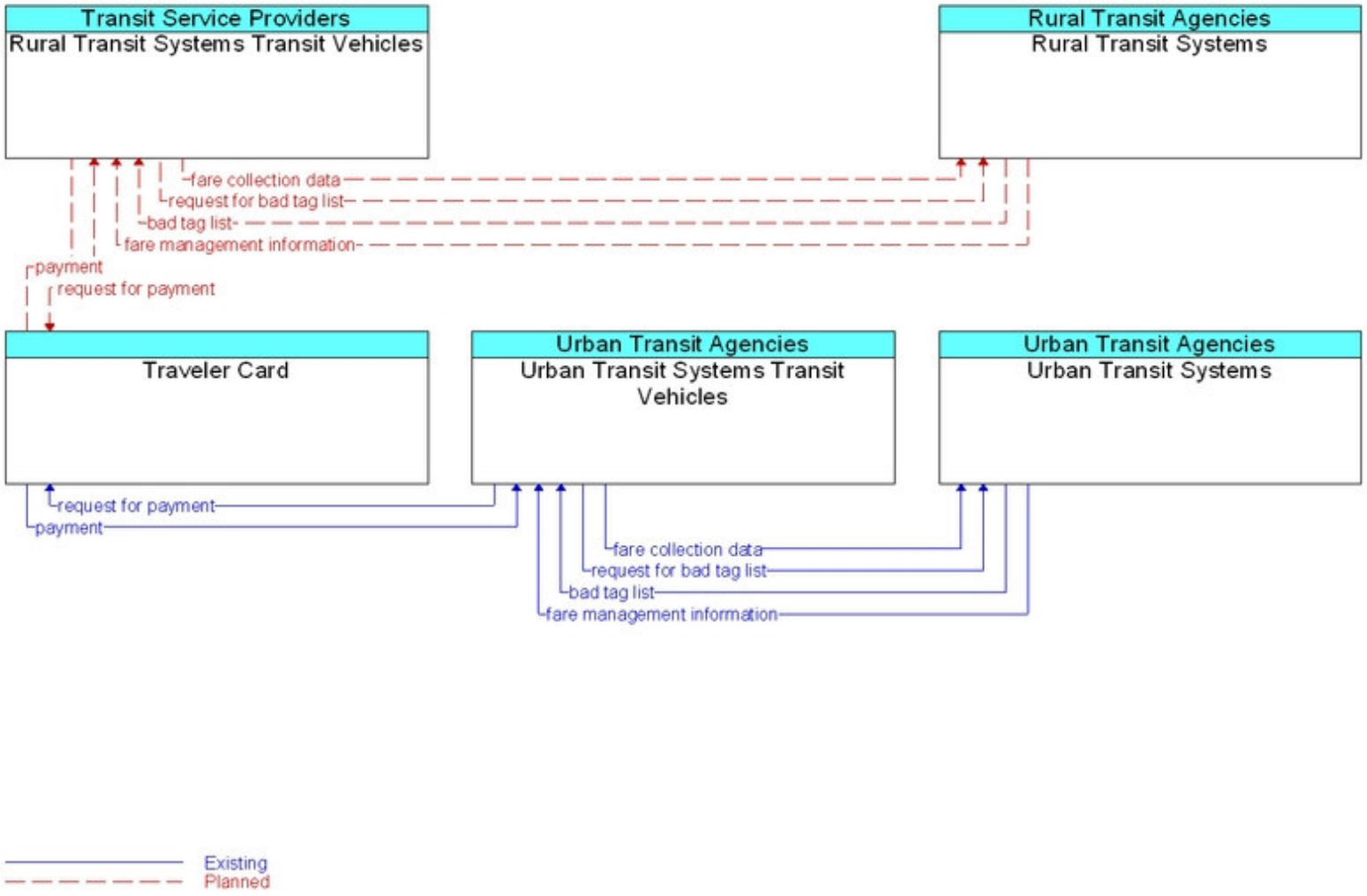
transit schedule information
transit vehicle operator information
Existing
Planned


Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Rural Transit Systems Transit Vehicles
transit vehicle operator information
demand response passenger and use data
Urban Transit Agencies
Urban Transit Systems
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
demand response passenger and use data
transit vehicle operator information
Existing
Planned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Rural Transit Systems Transit Vehicles
Rural Transit Agencies
Rural Transit Systems
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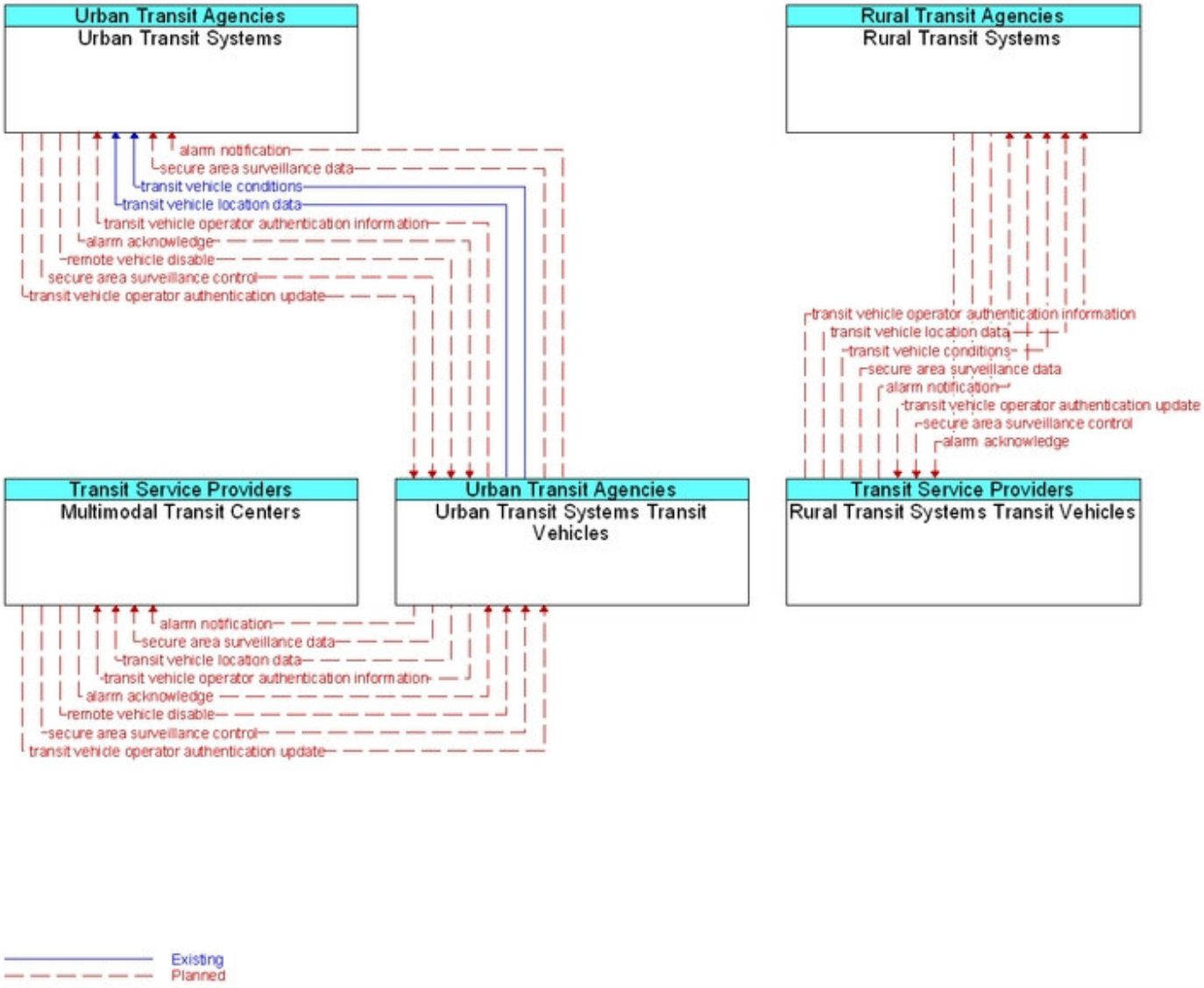
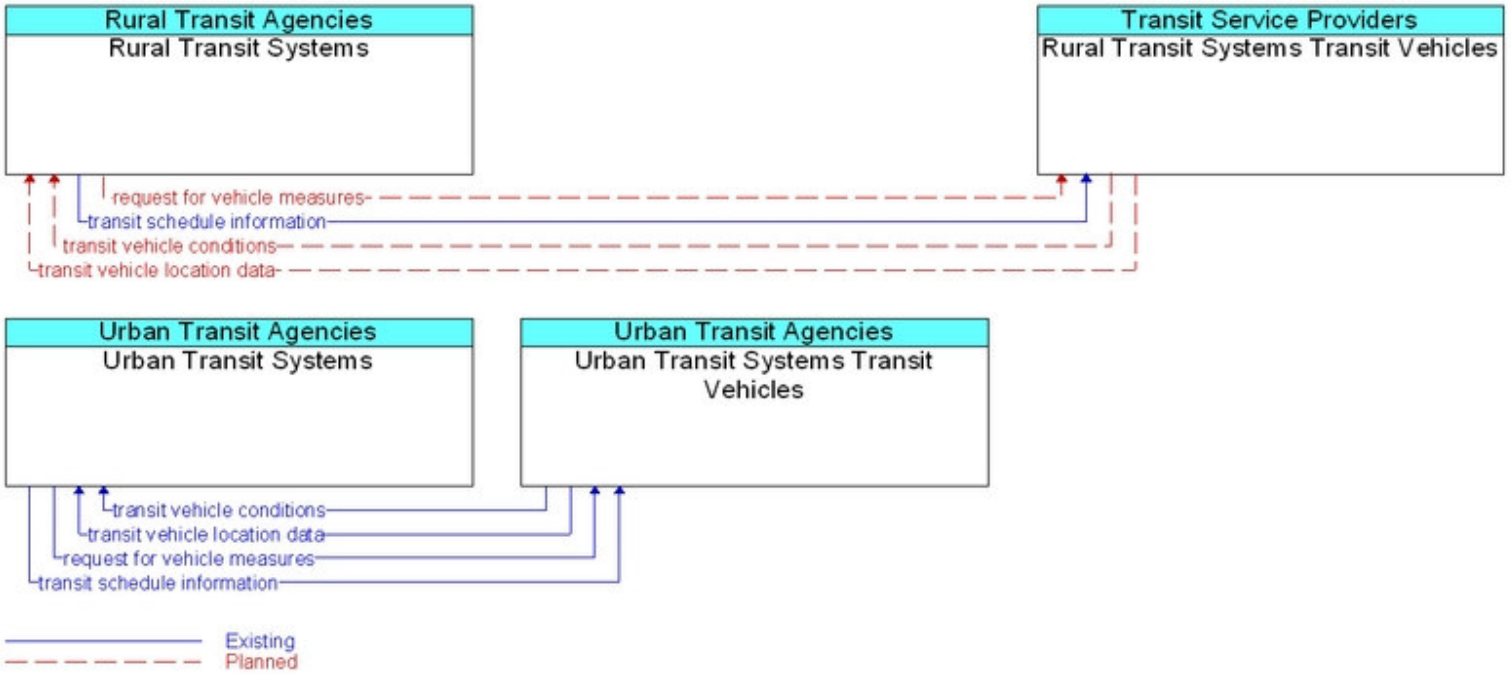
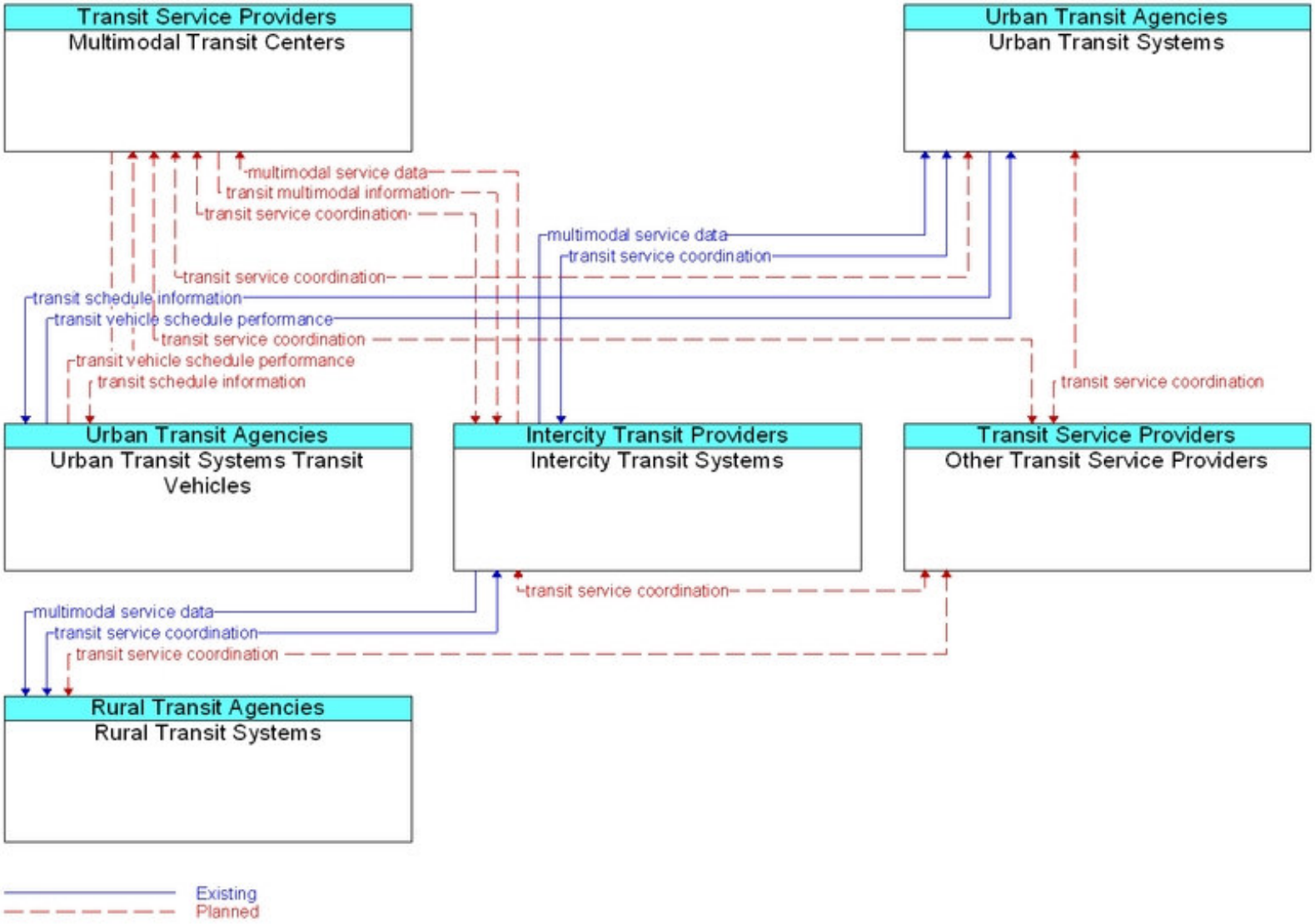
request for bad tag list
bad tag list
fare management information
payment
request for payment
Traveler Card
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems
request for payment
payment
fare collection data
request for bad tag list
bad tag list
fare management information
Existing
Planned


Urban Transit Agencies
Urban Transit Systems
Rural Transit Agencies
Rural Transit Systems
alarm notification
secure area surveillance data
transit vehicle conditions
transit vehicle location data
transit vehicle operator authentication information
alarm acknowledge
remote vehicle disable
secure area surveillance control
transit vehicle operator authentication update
transit vehicle operator authentication information
transit vehicle location data
transit vehicle conditions
secure area surveillance data
alarm notification
transit vehicle operator authentication update
secure area surveillance control
alarm acknowledge
Transit Service Providers
Multimodal Transit Centers
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Transit Service Providers
Rural Transit Systems Transit Vehicles
alarm notification
secure area surveillance data
transit vehicle location data
transit vehicle operator authentication information
alarm acknowledge
remote vehicle disable
secure area surveillance control
transit vehicle operator authentication update
Existing
Planned


Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Rural Transit Systems Transit Vehicles
request for vehicle measures
transit schedule information
transit vehicle conditions
transit vehicle location data
Urban Transit Agencies
Urban Transit Systems
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
transit vehicle conditions
transit vehicle location data
request for vehicle measures
transit schedule information
Existing
Planned


Transit Service Providers
Multimodal Transit Centers
Urban Transit Agencies
Urban Transit Systems
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transit multimodal information
transit service coordination
multimodal service data
transit service coordination
transit service coordination
transit schedule information
transit vehicle schedule performance
transit service coordination
transit vehicle schedule performance
transit schedule information
transit service coordination
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Intercity Transit Providers
Intercity Transit Systems
Transit Service Providers
Other Transit Service Providers
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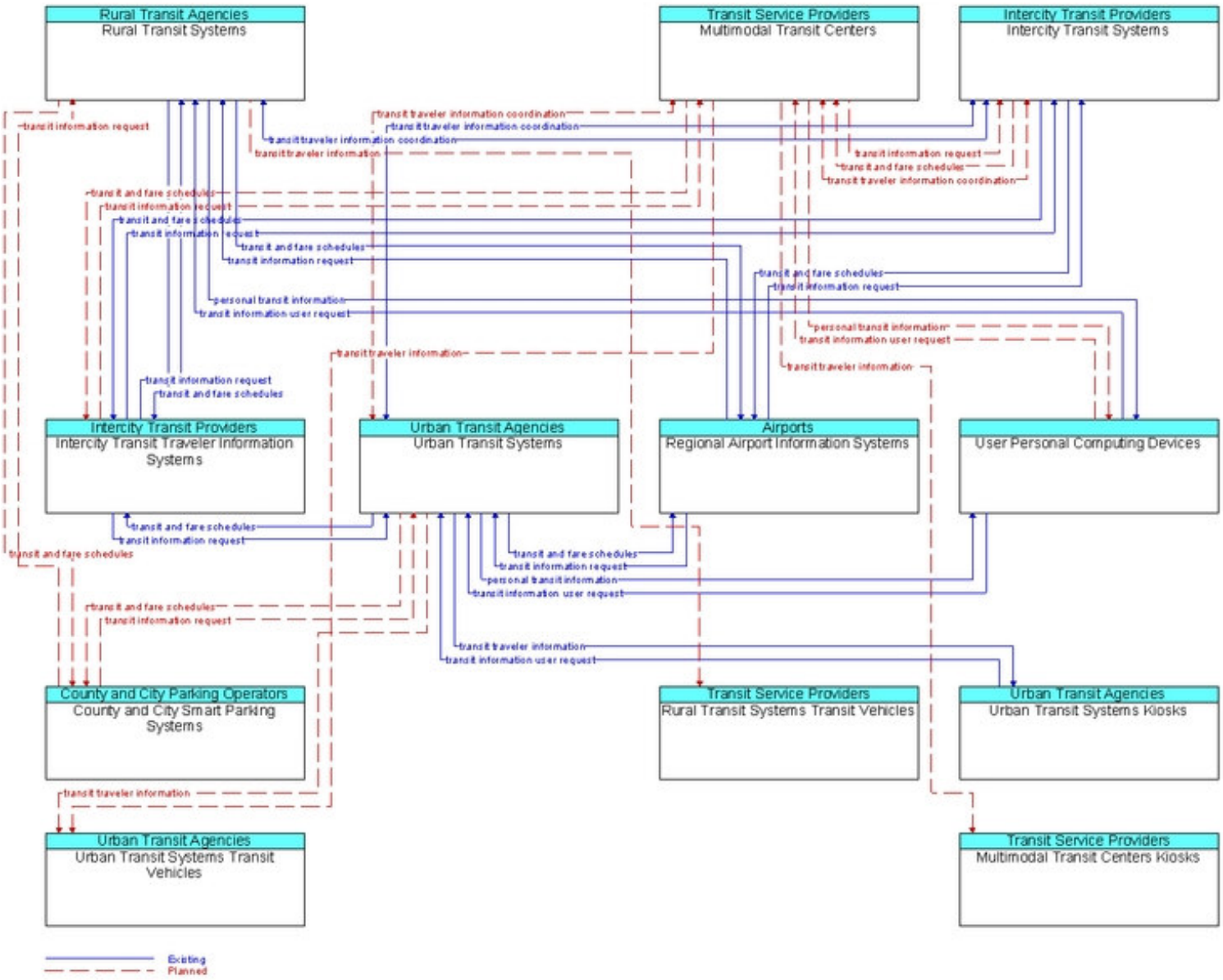
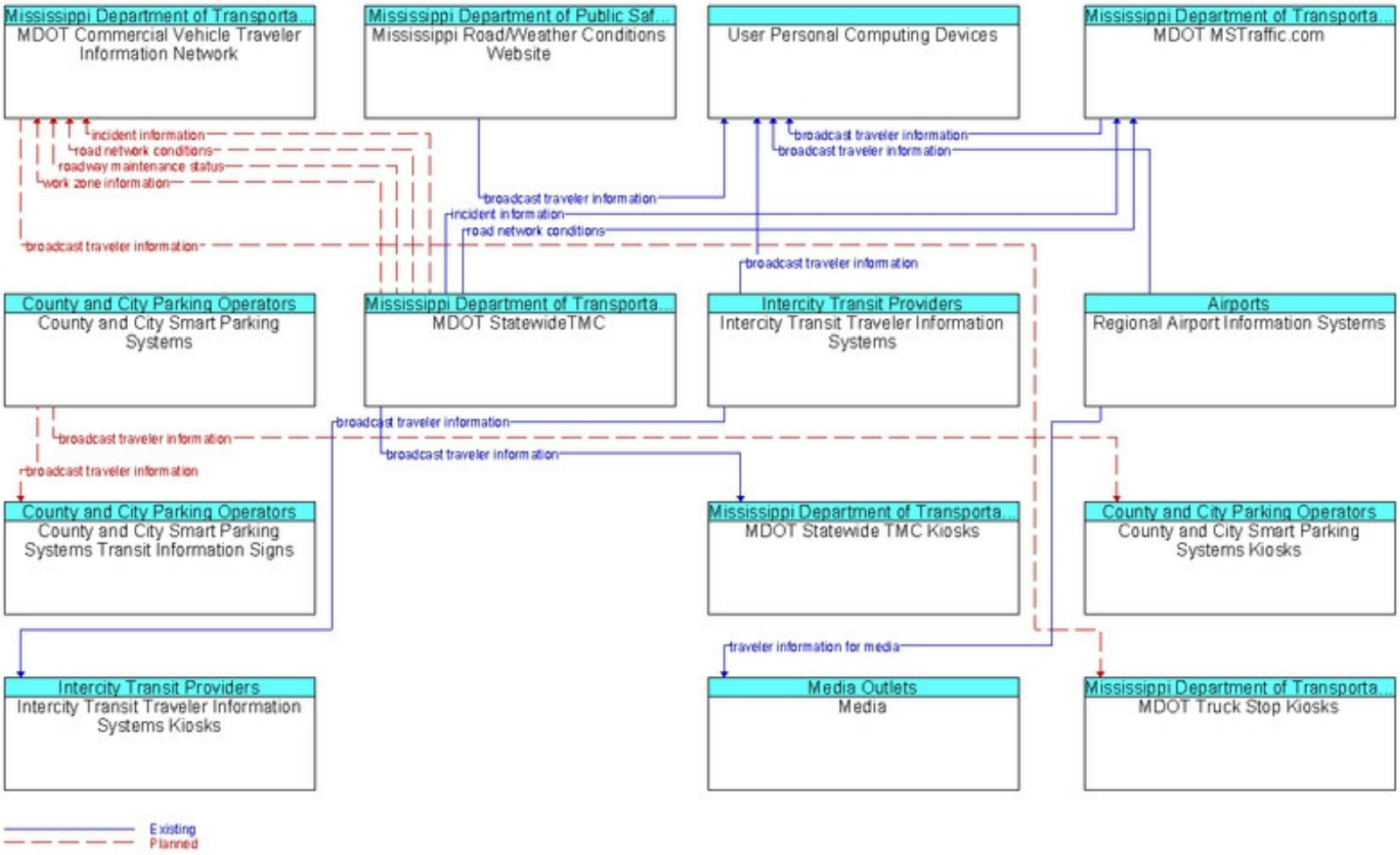
multimodal service data
transit service coordination
transit service coordination
Rural Transit Agencies
Rural Transit Systems
Existing
Planned


Rural Transit Agencies
Rural Transit Systems
Transit Service Providers
Multimodal Transit Centers
Intercity Transit Providers
Intercity Transit Systems
transit information request
transit traveler information coordination
transit traveler information
transit and fare schedules
personal transit information
transit information user request
Intercity Transit Providers
Intercity Transit Traveler Information Systems
Urban Transit Agencies
Urban Transit Systems
Airports
Regional Airport Information Systems
User Personal Computing Devices
County and City Parking Operators
County and City Smart Parking Systems
Transit Service Providers
Rural Transit Systems Transit Vehicles
Urban Transit Agencies
Urban Transit Systems Kiosks
Urban Transit Agencies
Urban Transit Systems Transit Vehicles
Transit Service Providers
Multimodal Transit Centers Kiosks
Existing
Planned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Mississippi Department of Public Saf...
Mississippi Road/Weather Conditions Website
User Personal Computing Devices
Mississippi Department of Transporta...
MDOT MSTraffic.com
incident information
road network conditions
roadway maintenance status
work zone information
broadcast traveler information
broadcast traveler information
broadcast traveler information
broadcast traveler information
incident information
road network conditions
broadcast traveler information
broadcast traveler information
County and City Parking Operators
County and City Smart Parking Systems
Mississippi Department of Transporta...
MDOT StatewideTMC
Intercity Transit Providers
Intercity Transit Traveler Information Systems
Airports
Regional Airport Information Systems
broadcast traveler information
broadcast traveler information
broadcast traveler information
broadcast traveler information
broadcast traveler information
County and City Parking Operators
County and City Smart Parking Systems Transit Information Signs
Mississippi Department of Transporta...
MDOT Statewide TMC Kiosks
County and City Parking Operators
County and City Smart Parking Systems Kiosks
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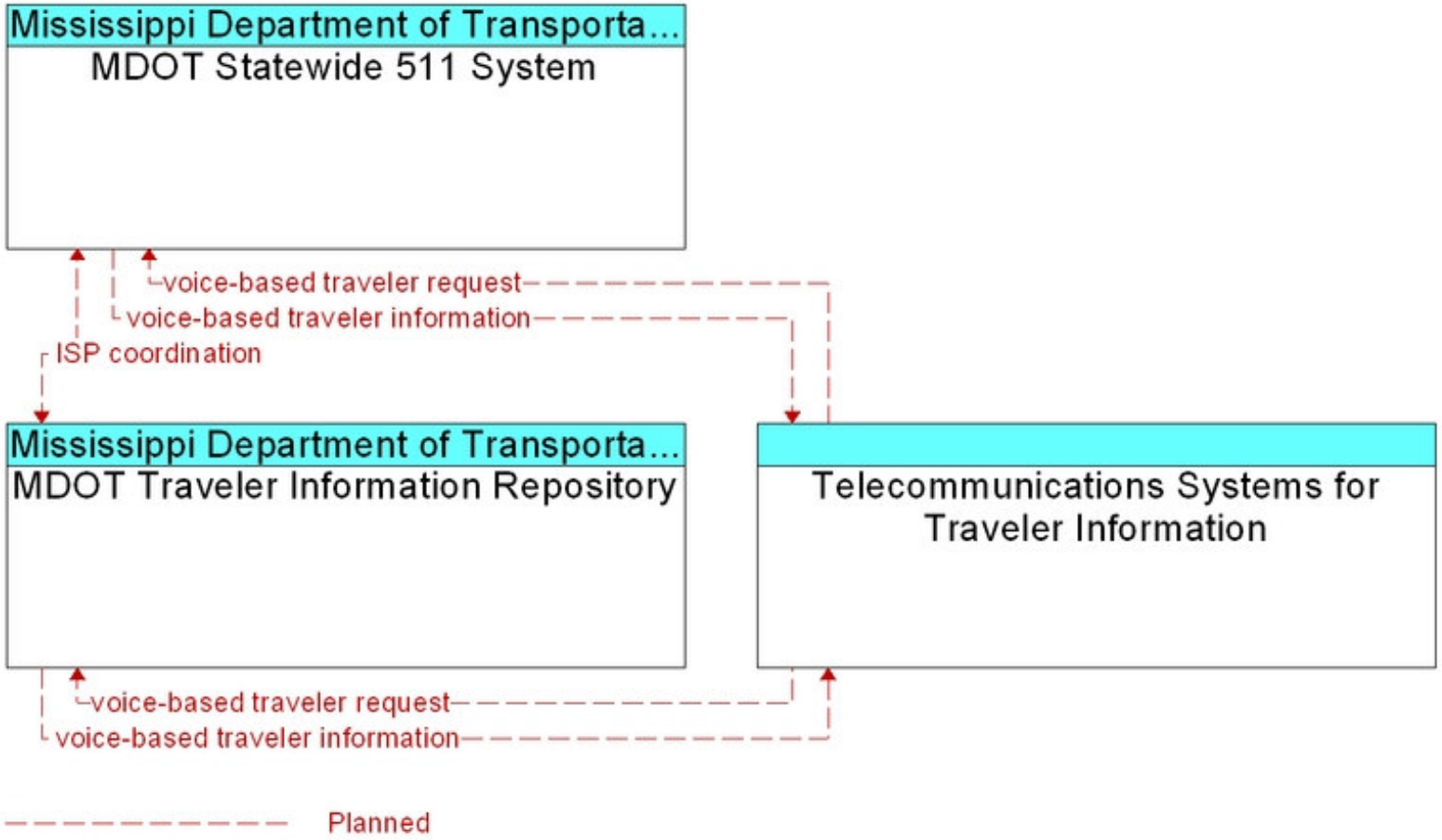
Intercity Transit Providers
Intercity Transit Traveler Information Systems Kiosks
Media Outlets
Media
Mississippi Department of Transporta...
MDOT Truck Stop Kiosks
Existing
Planned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voice-based traveler information
ISP coordination
Mississippi Department of Transporta...
MDOT Traveler Information Repository
Telecommunications Systems for Traveler Information
voice-based traveler request
voice-based traveler information
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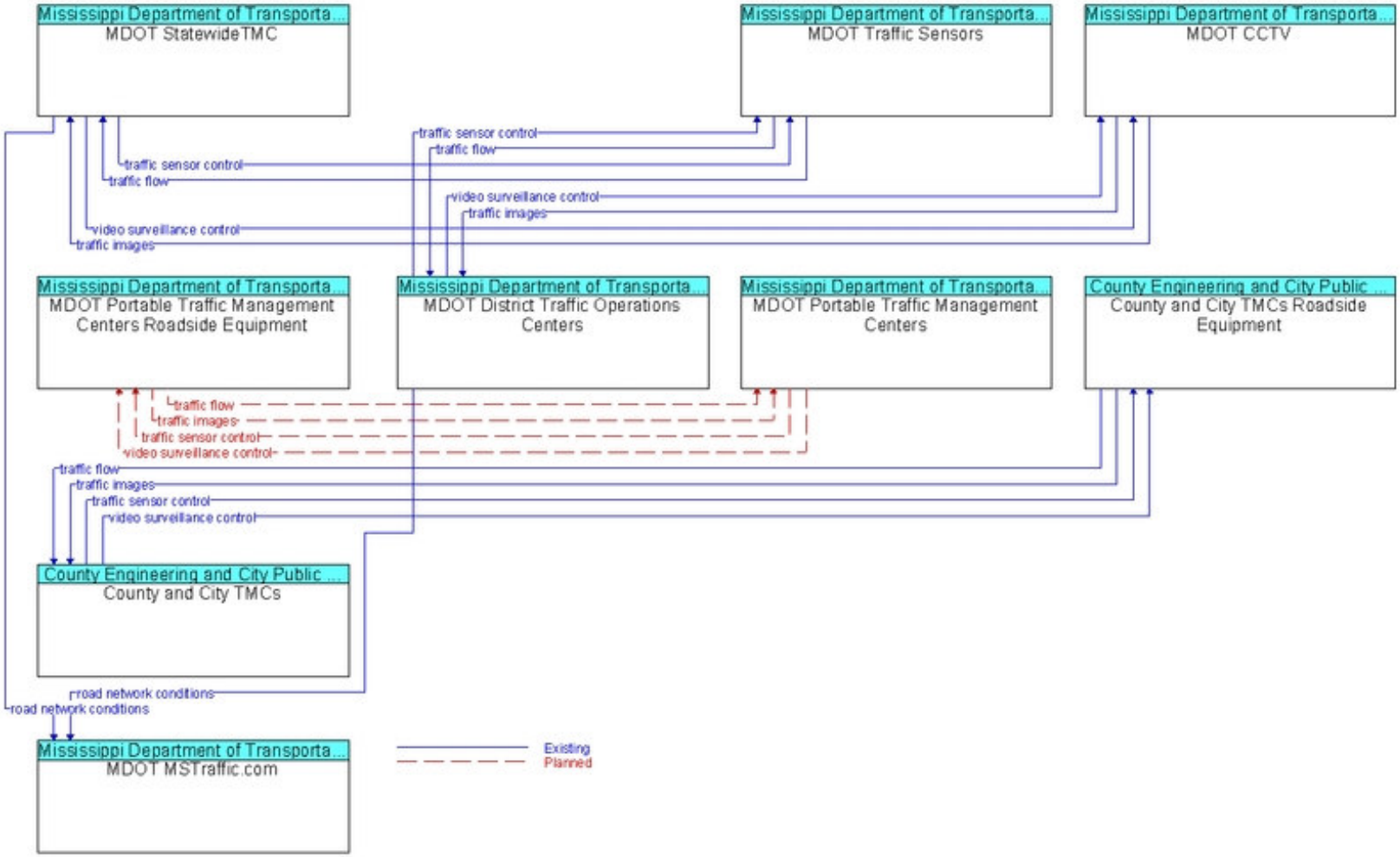
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Mississippi Department of Transporta...
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Mississippi Department of Transporta...
MDOT CCTV
traffic sensor control
traffic flow
traffic sensor control
traffic flow
video surveillance control
traffic images
video surveillance control
traffic images
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
County Engineering and City Public ...
County and City TMCs Roadside Equipment
traffic flow
traffic images
traffic sensor control
video surveillance control
traffic flow
traffic images
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video surveillance control
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County and City TMCs
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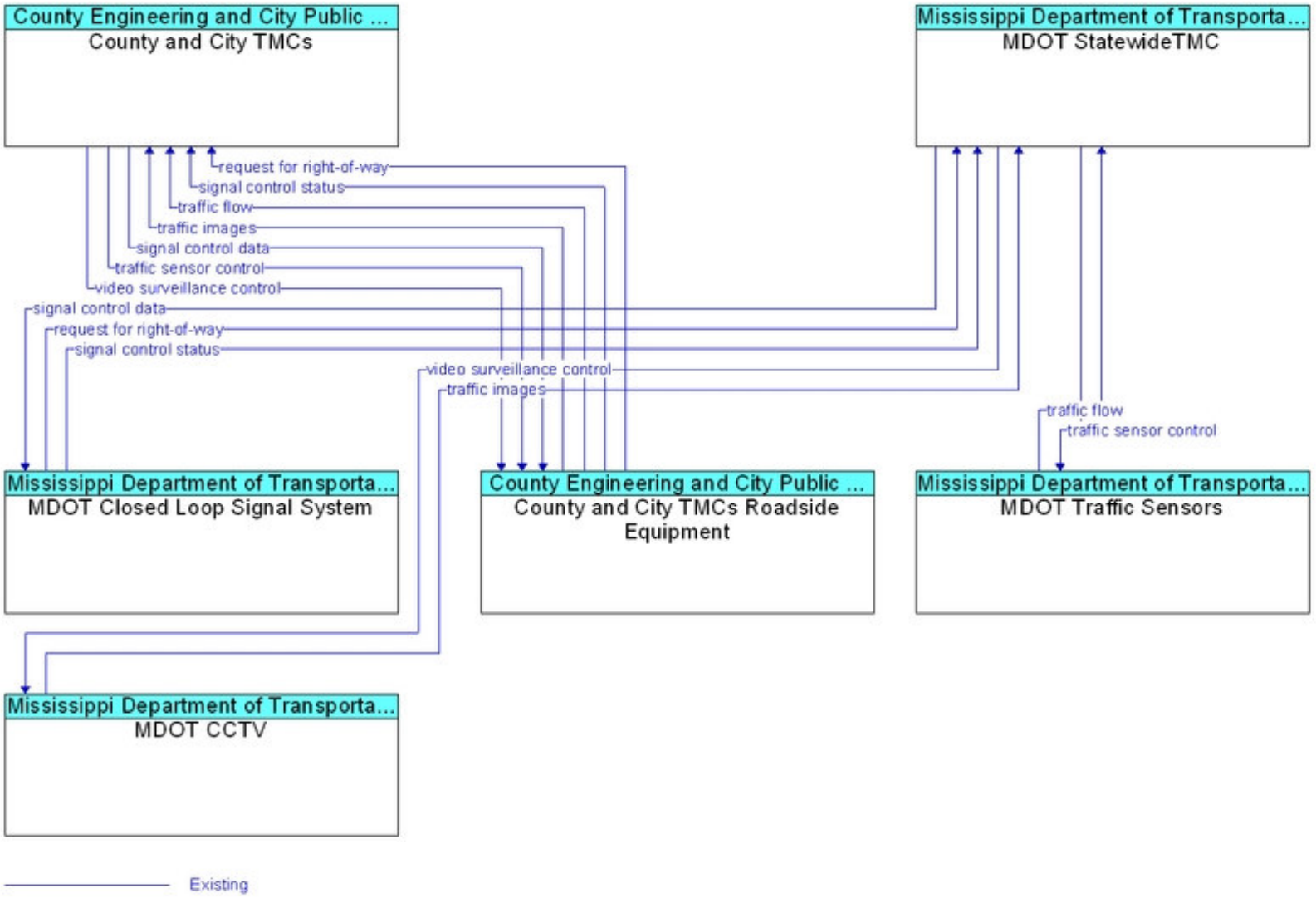
road network conditions
Mississippi Department of Transporta...
MDOT MSTraffic.com
Existing
Planned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Mississippi Department of Transporta...
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signal control status
traffic flow
traffic images
signal control data
traffic sensor control
video surveillance control
signal control data
request for right-of-way
signal control status
video surveillance control
traffic images
traffic flow
traffic sensor control
Mississippi Department of Transporta...
MDOT Closed Loop Signal System
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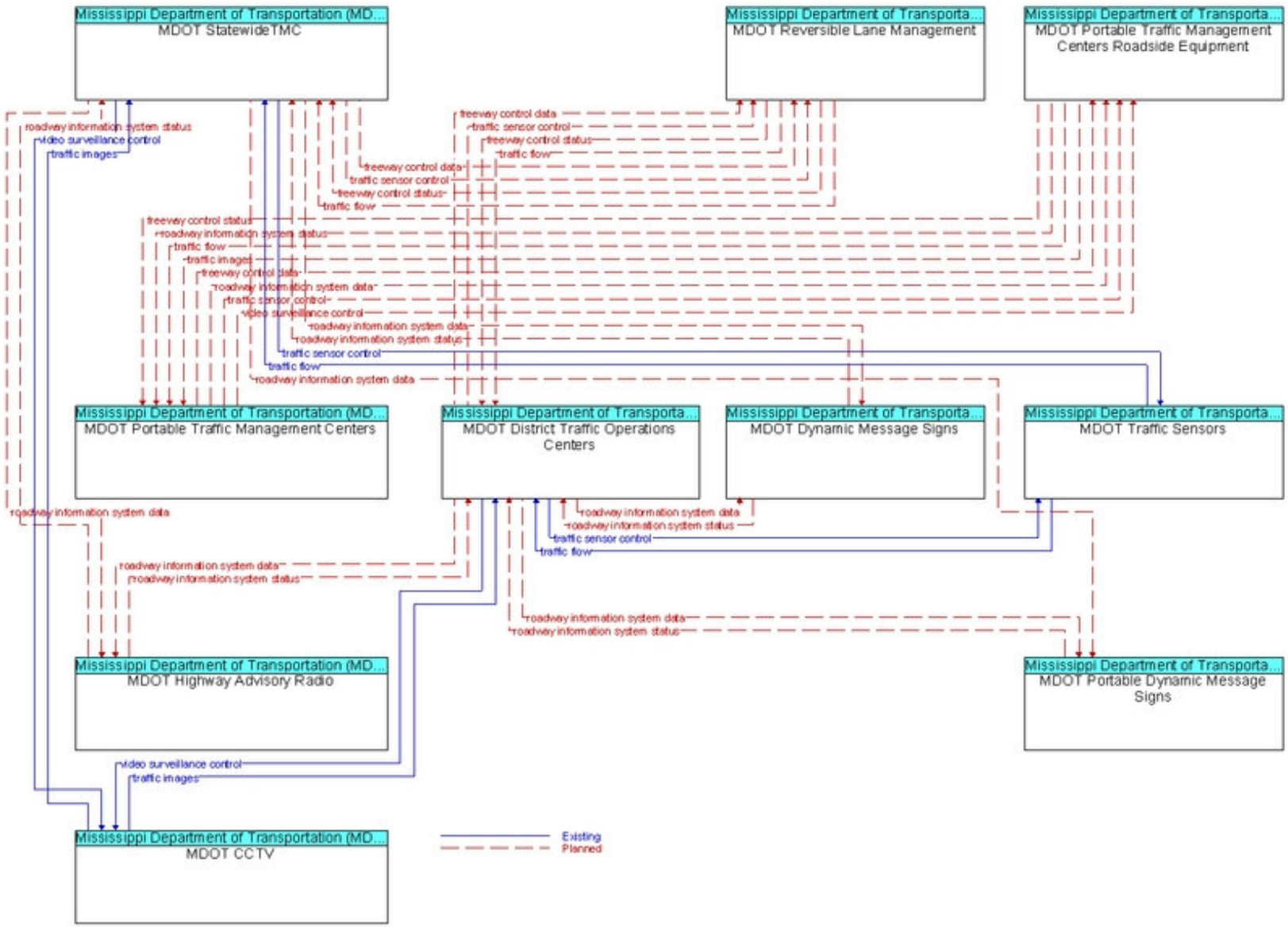
County and City TMCs Roadside Equipment
Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transporta...
MDOT CCTV
Existing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Mississippi Department of Transporta...
MDOT Reversible Lane Management
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
Mississippi Department of Transportation (MD...
MDOT Portable Traffic Management Centers
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Dynamic Message Signs
Mississippi Department of Transporta...
MDOT Traffic Sensors
Mississippi Department of Transportation (MD...
MDOT Highway Advisory Radio
Mississippi Department of Transporta...
MDOT Portable Dynamic Message Signs
Mississippi Department of Transportation (MD...
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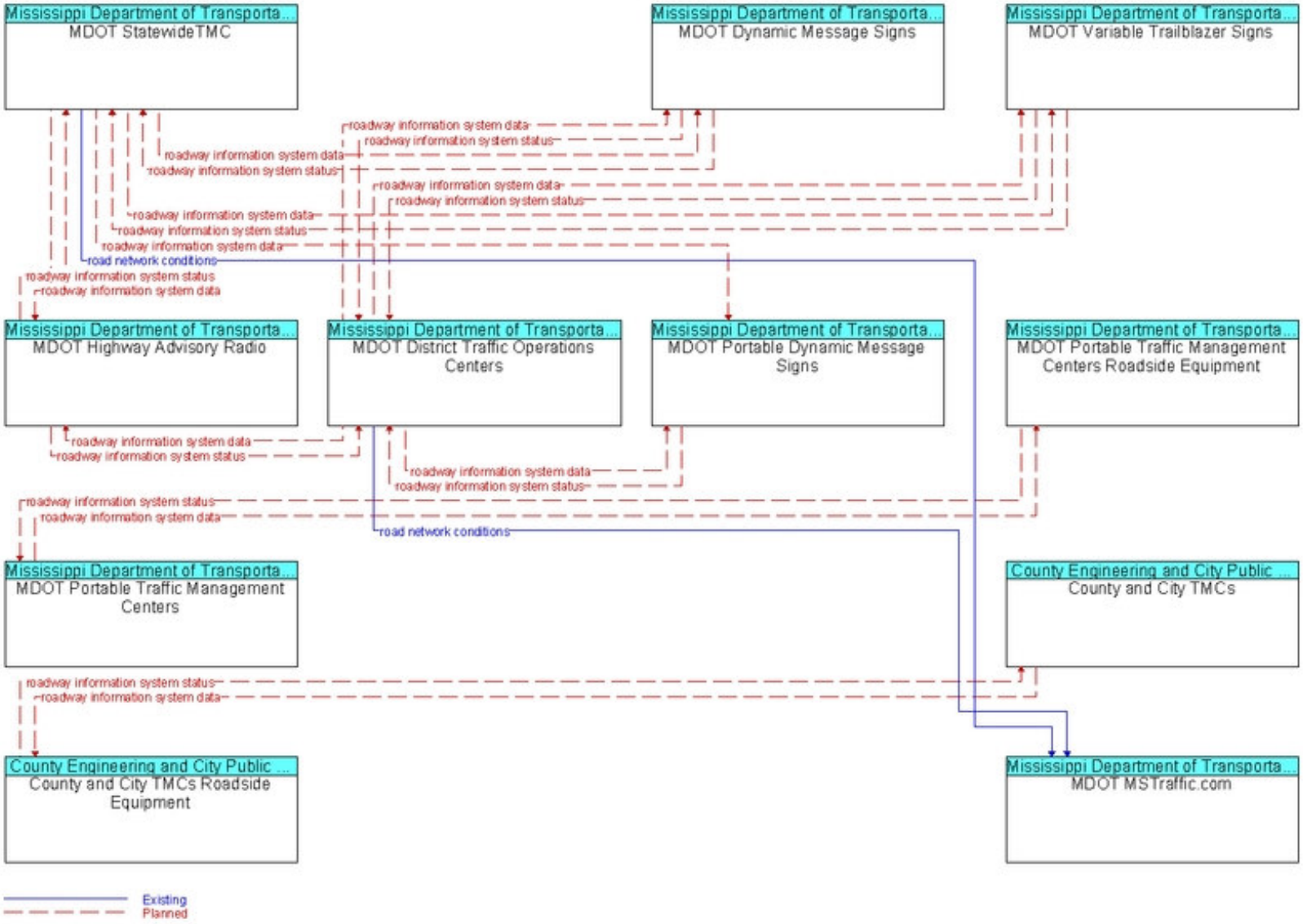
video surveillance control
traffic images
treeway control data
traffic sensor control
treeway control status
traffic flow
roadway information system data
Existing
Planned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Mississippi Department of Transporta...
MDOT Dynamic Message Signs
Mississippi Department of Transporta...
MDOT Variable Trailblazer Signs
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roadway information system data
roadway information system status
roadway information system data
roadway information system status
roadway information system data
roadway information system status
roadway information system data
road network conditions
roadway information system status
roadway information system data
Mississippi Department of Transporta...
MDOT Highway Advisory Radio
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Portable Dynamic Message Signs
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
roadway information system data
roadway information system status
roadway information system data
roadway information system status
roadway information system status
roadway information system data
road network conditions
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
County Engineering and City Public ...
County and City TMCs
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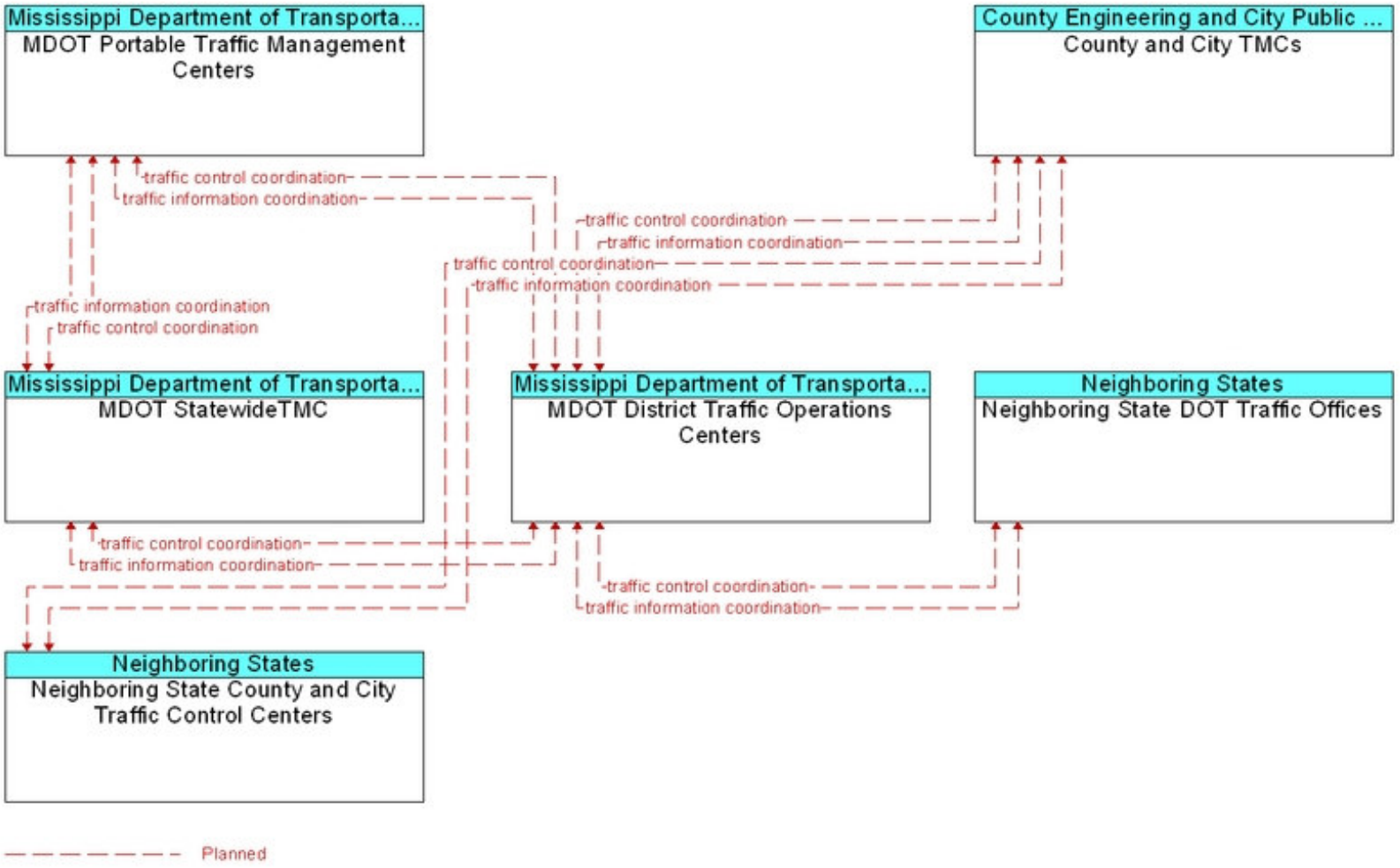
County Engineering and City Public ...
County and City TMCs Roadside Equipment
Mississippi Department of Transporta...
MDOT MSTraffic.com
Existing
Planned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County Engineering and City Public ...
County and City TMCs
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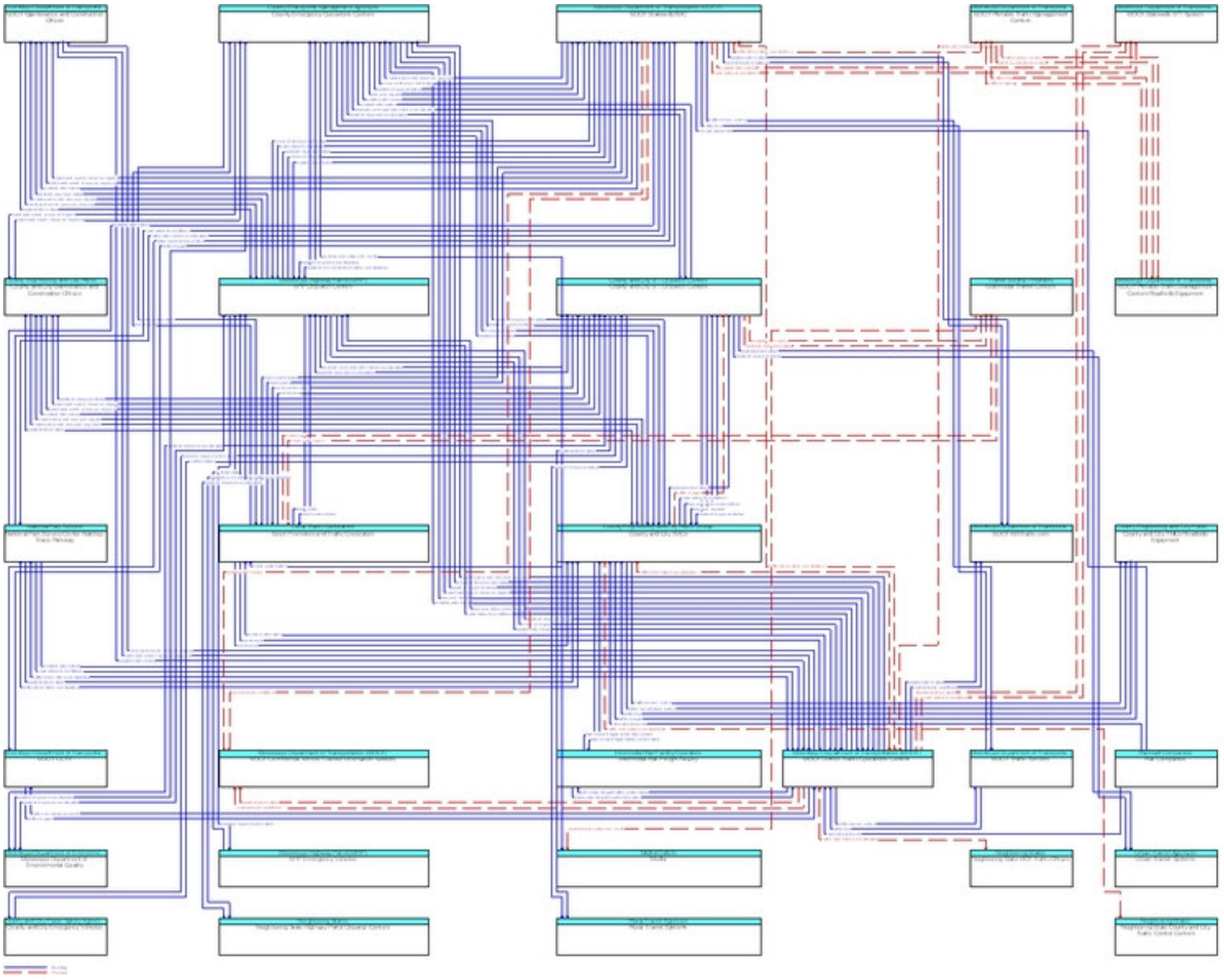
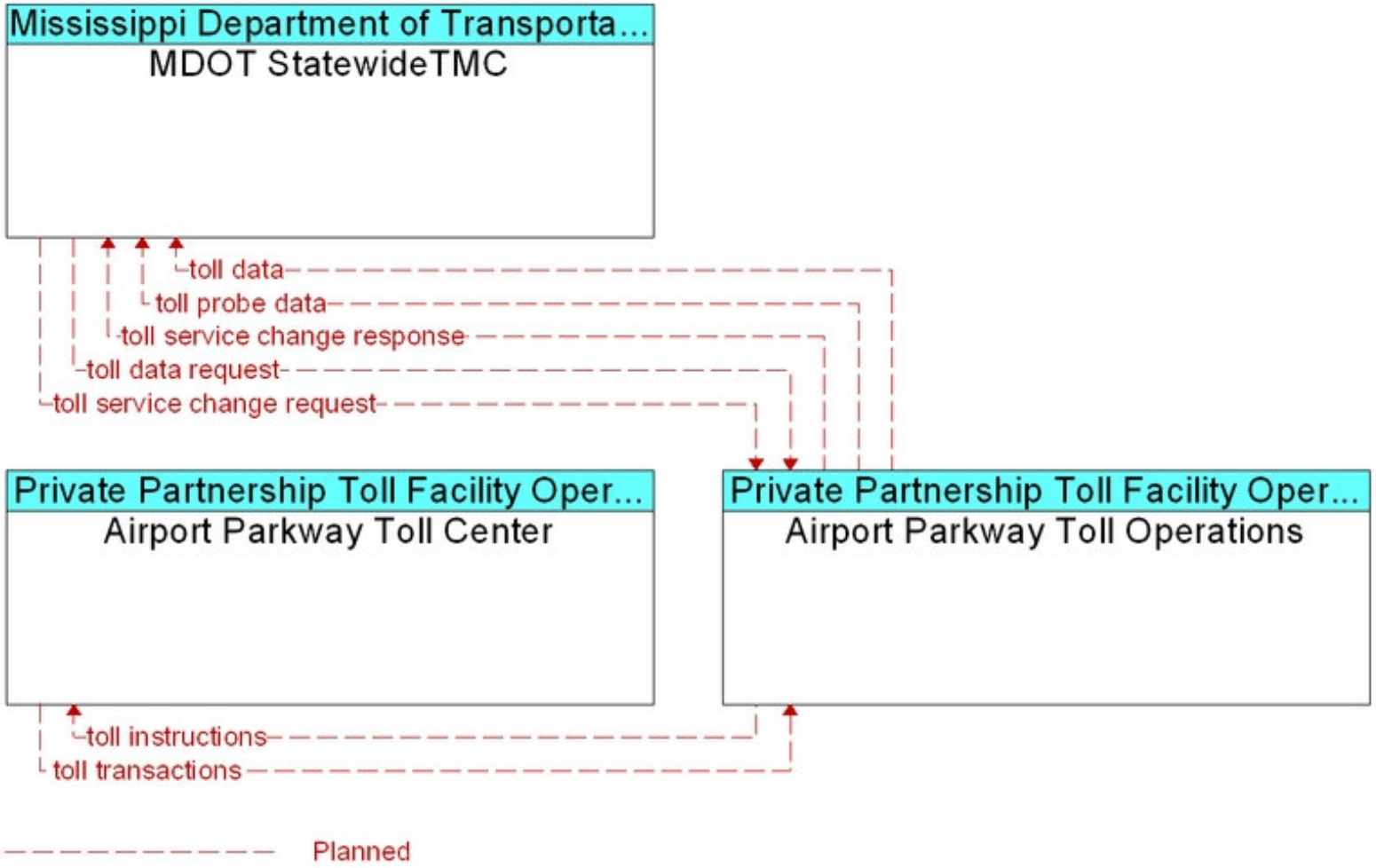
traffic control coordination
traffic information coordination
traffic control coordination
traffic information coordination
traffic information coordination
traffic control coordination
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Neighboring States
Neighboring State DOT Traffic Offices
traffic control coordination
traffic information coordination
traffic control coordination
traffic information coordination
Neighboring States
Neighboring State County and City Traffic Control Centers
Planned

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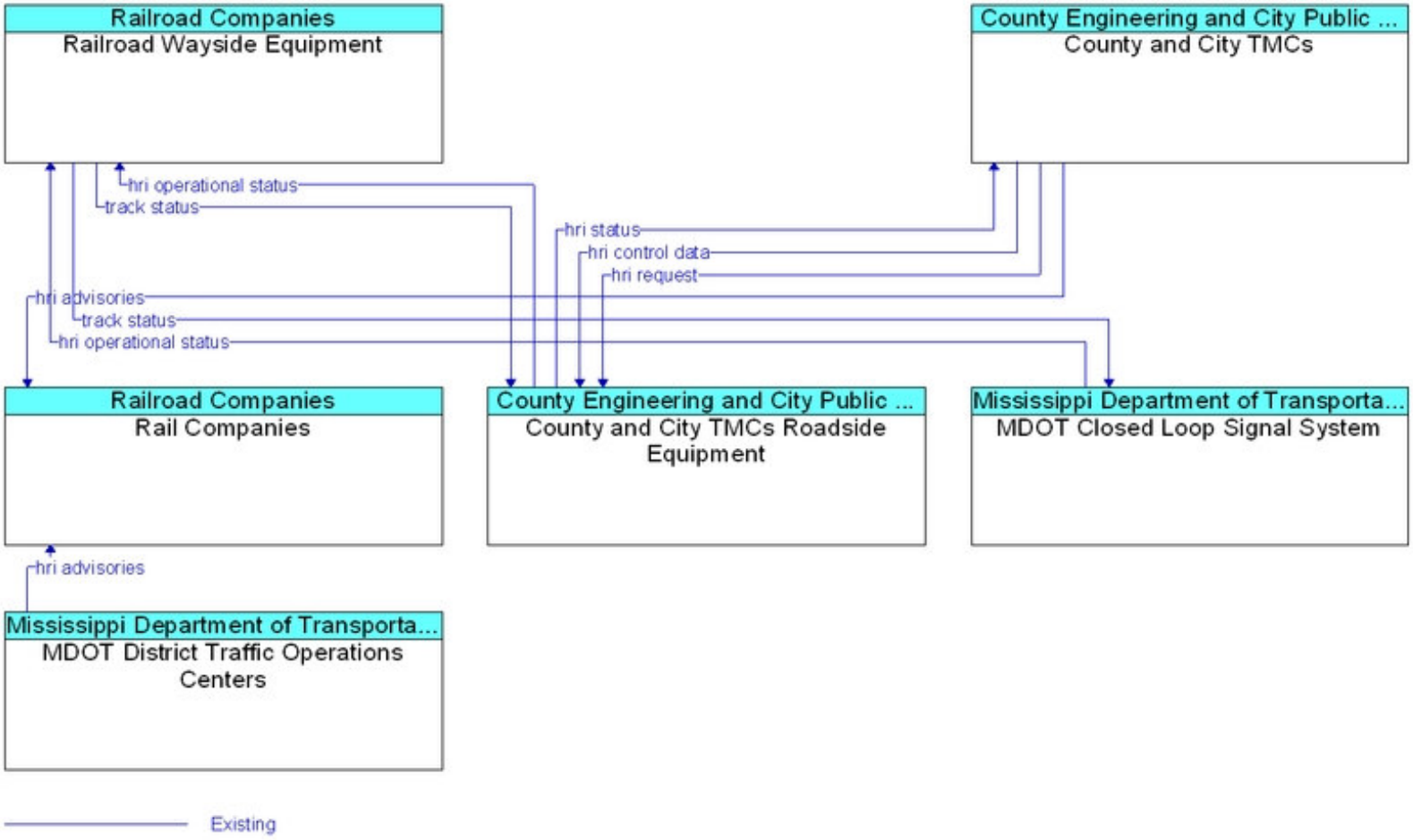
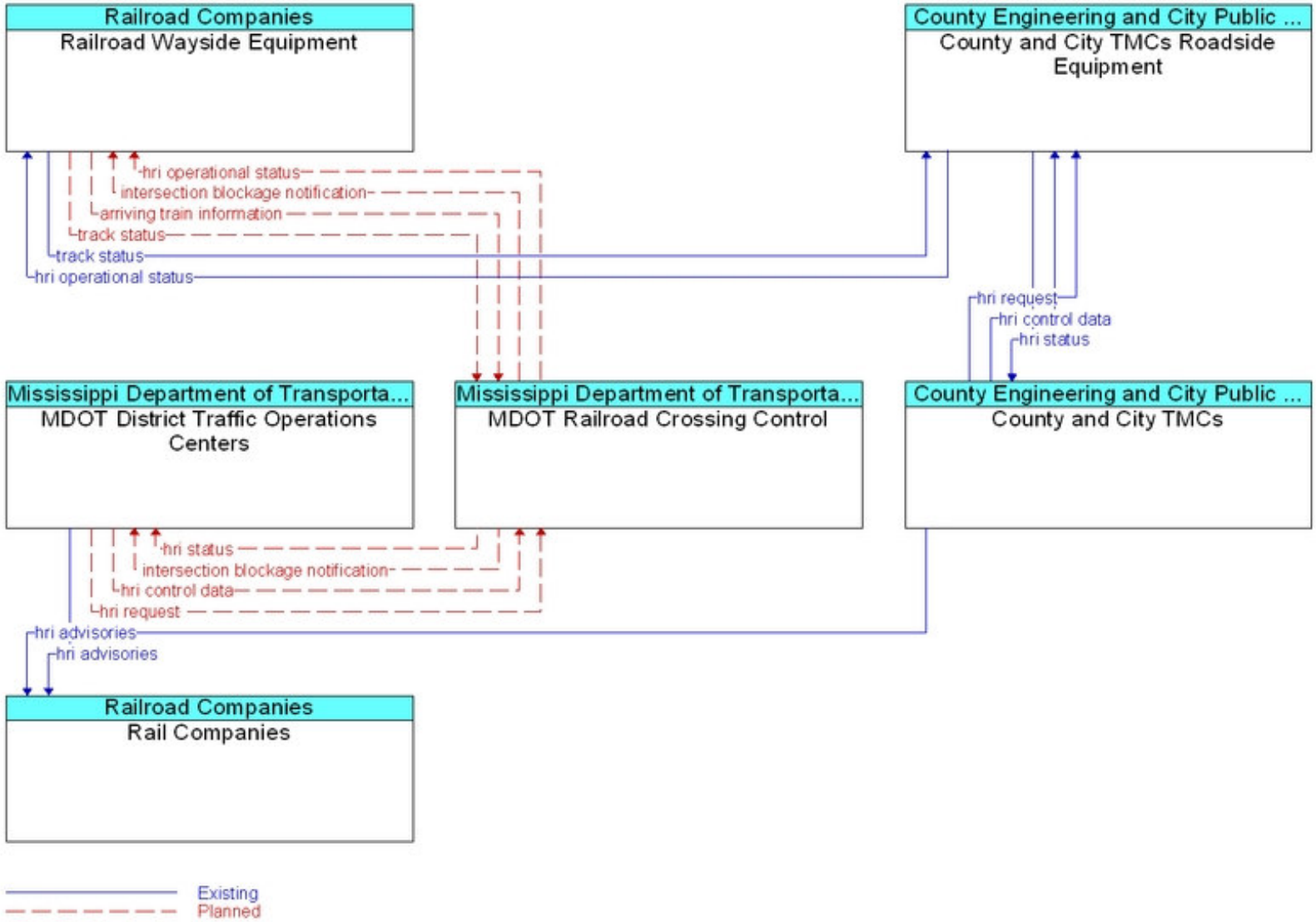
toll probe data
toll service change response
toll data request
toll service change request
Private Partnership Toll Facility Oper...
Airport Parkway Toll Center
Private Partnership Toll Facility Oper...
Airport Parkway Toll Operations
toll instructions
toll transactions
Planned


Railroad Companies
Railroad Wayside Equipment
County Engineering and City Public ...
County and City TMCs
hri operational status
track status
hri status
hri control data
hri request
hri advisories
track status
hri operational status
Railroad Companies
Rail Companies
County Engineering and City Public ...
County and City TMCs Roadside Equipment
Mississippi Department of Transporta...
MDOT Closed Loop Signal System
hri advisories
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Existing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County and City TMCs Roadside Equipment
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intersection blockage notification
arriving train information
track status
track status
hri operational status
hri request
hri control data
hri status
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Railroad Crossing Control
County Engineering and City Public ...
County and City TMCs
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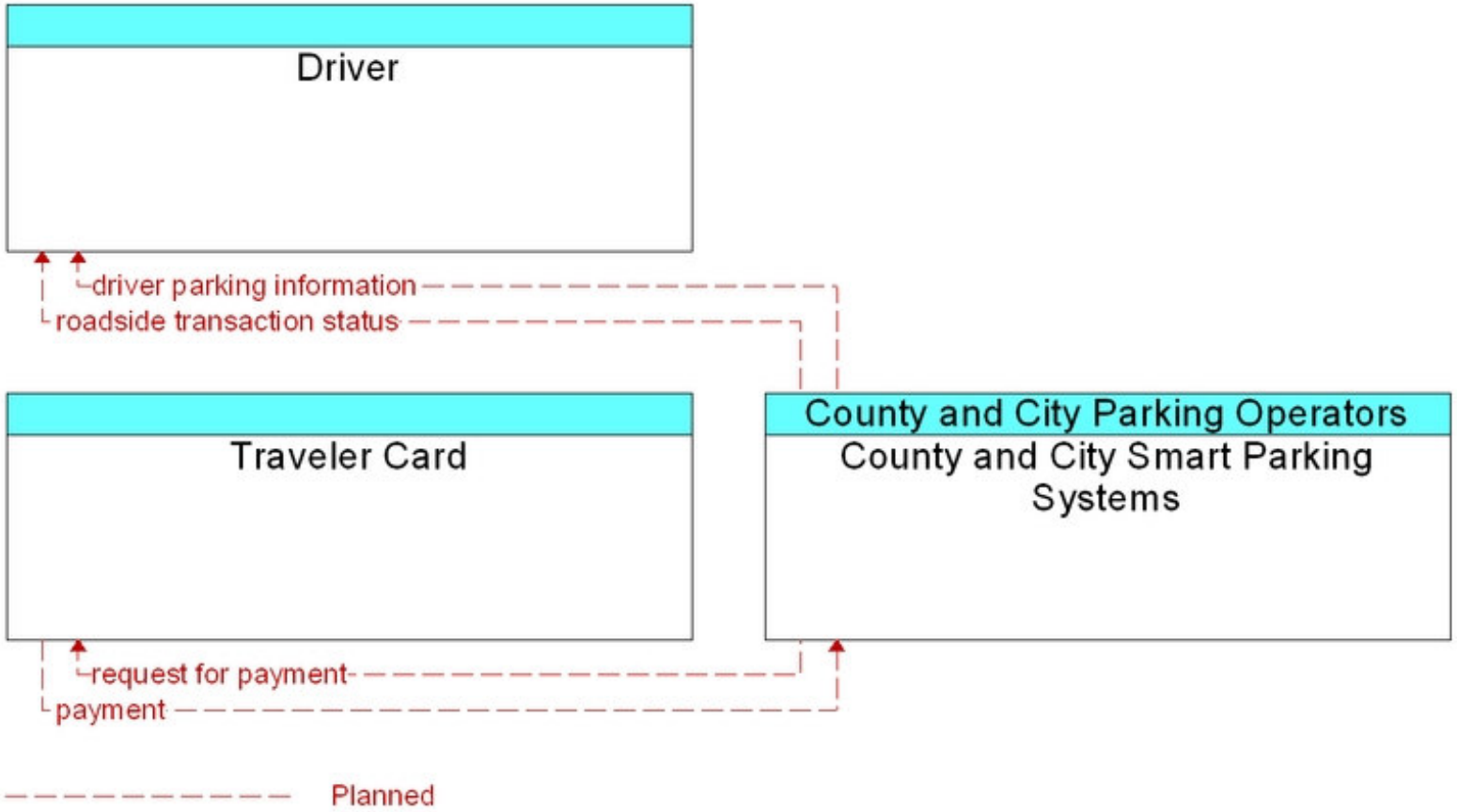
intersection blockage notification
hri control data
hri request
hri advisories
hri advisories
Railroad Companies
Rail Companies
Existing
Planned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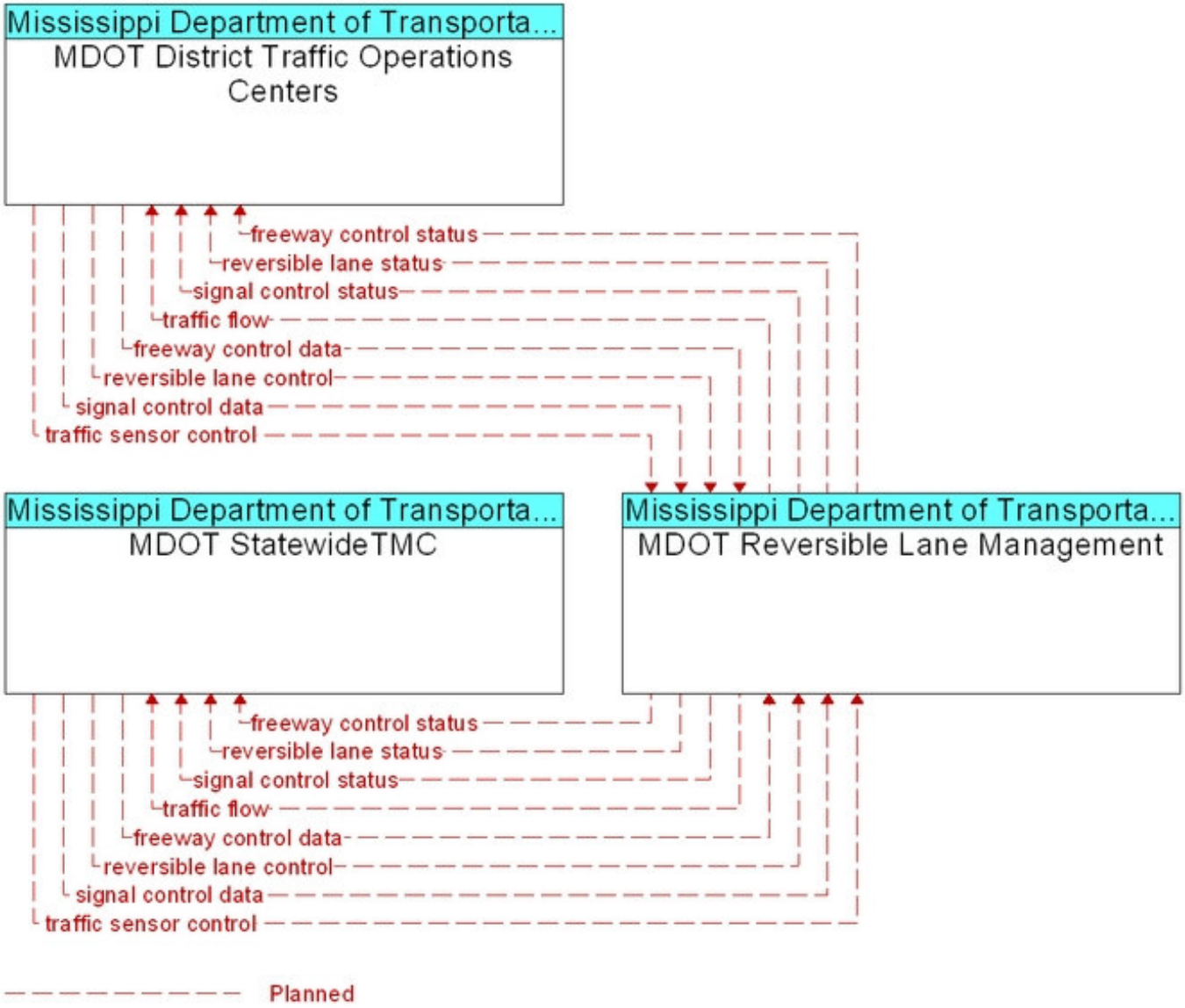
Traveler Card
County and City Parking Operators
County and City Smart Parking Systems
request for payment
payment
Planned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MDOT District Traffic Operations Centers
freeway control status
reversible lane status
signal control status
traffic flow
freeway control data
reversible lane control
signal control data
traffic sensor control
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Reversible Lane Management
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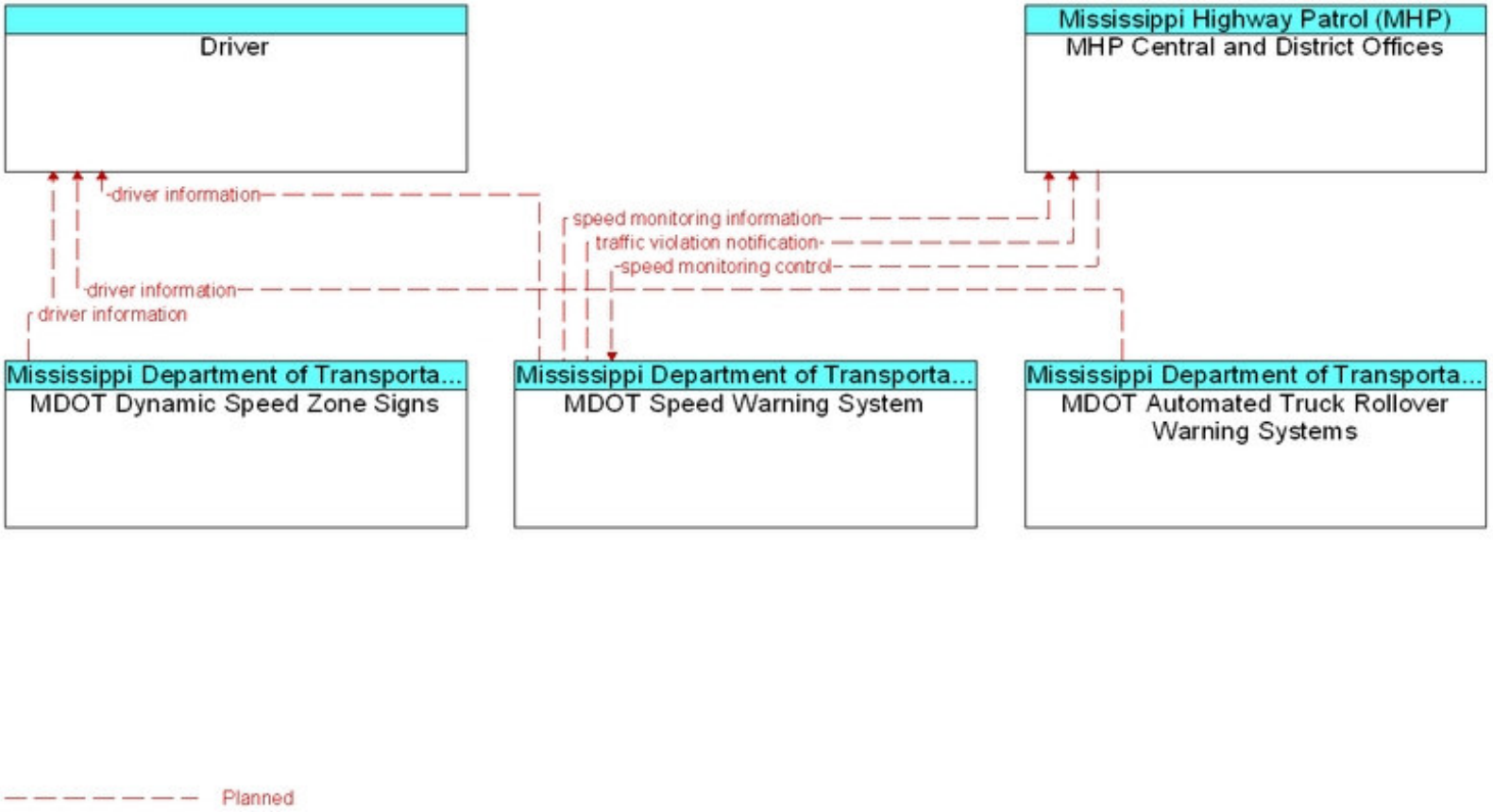
reversible lane status
signal control status
traffic flow
freeway control data
reversible lane control
signal control data
traffic sensor control
Planned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MHP Central and District Offices
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speed monitoring information
traffic violation notification
speed monitoring control
driver information
driver information
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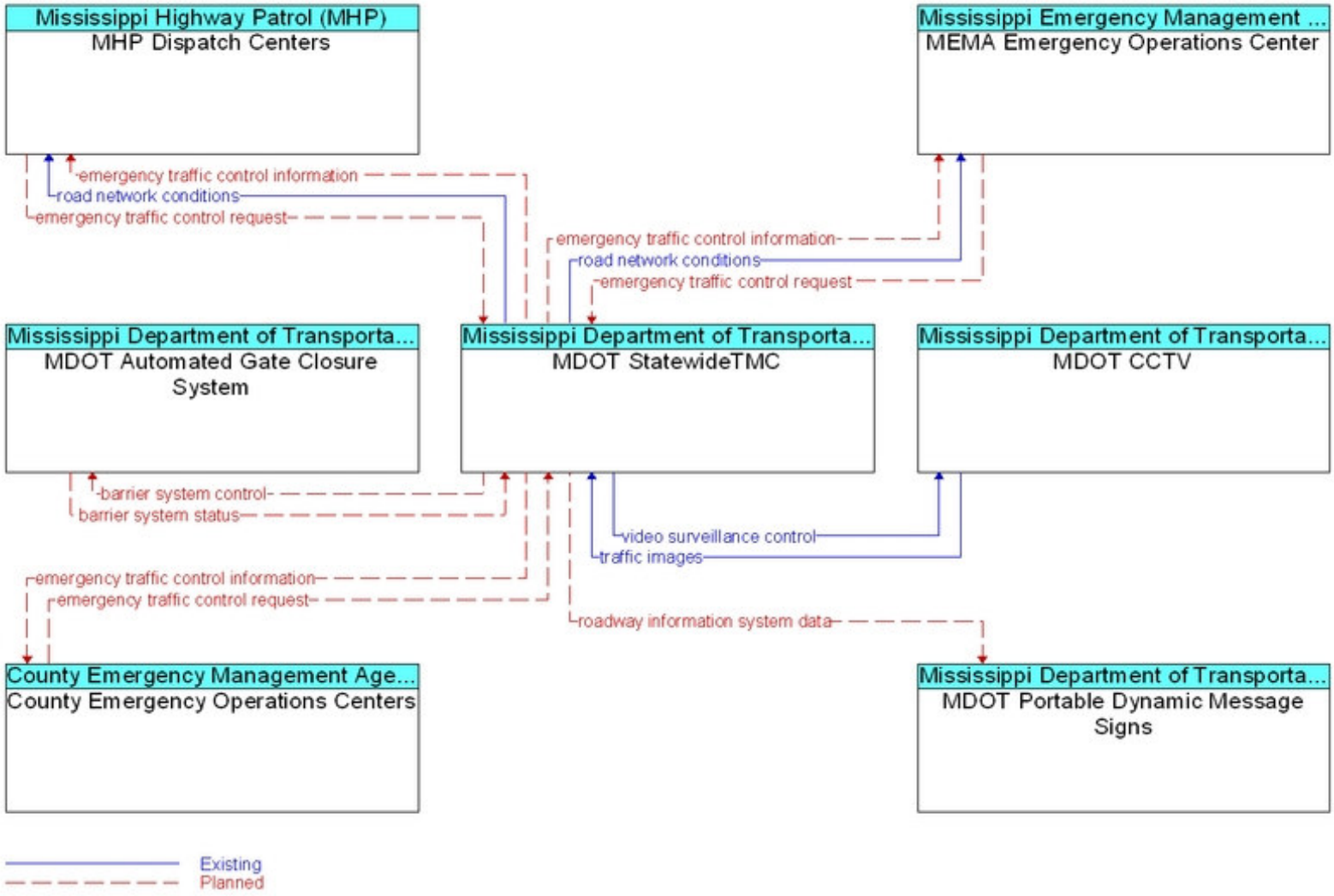
Mississippi Department of Transporta...
MDOT Speed Warning System
Mississippi Department of Transporta...
MDOT Automated Truck Rollover Warning Systems
Planned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MHP Dispatch Centers
Mississippi Emergency Management ...
MEMA Emergency Operations Center
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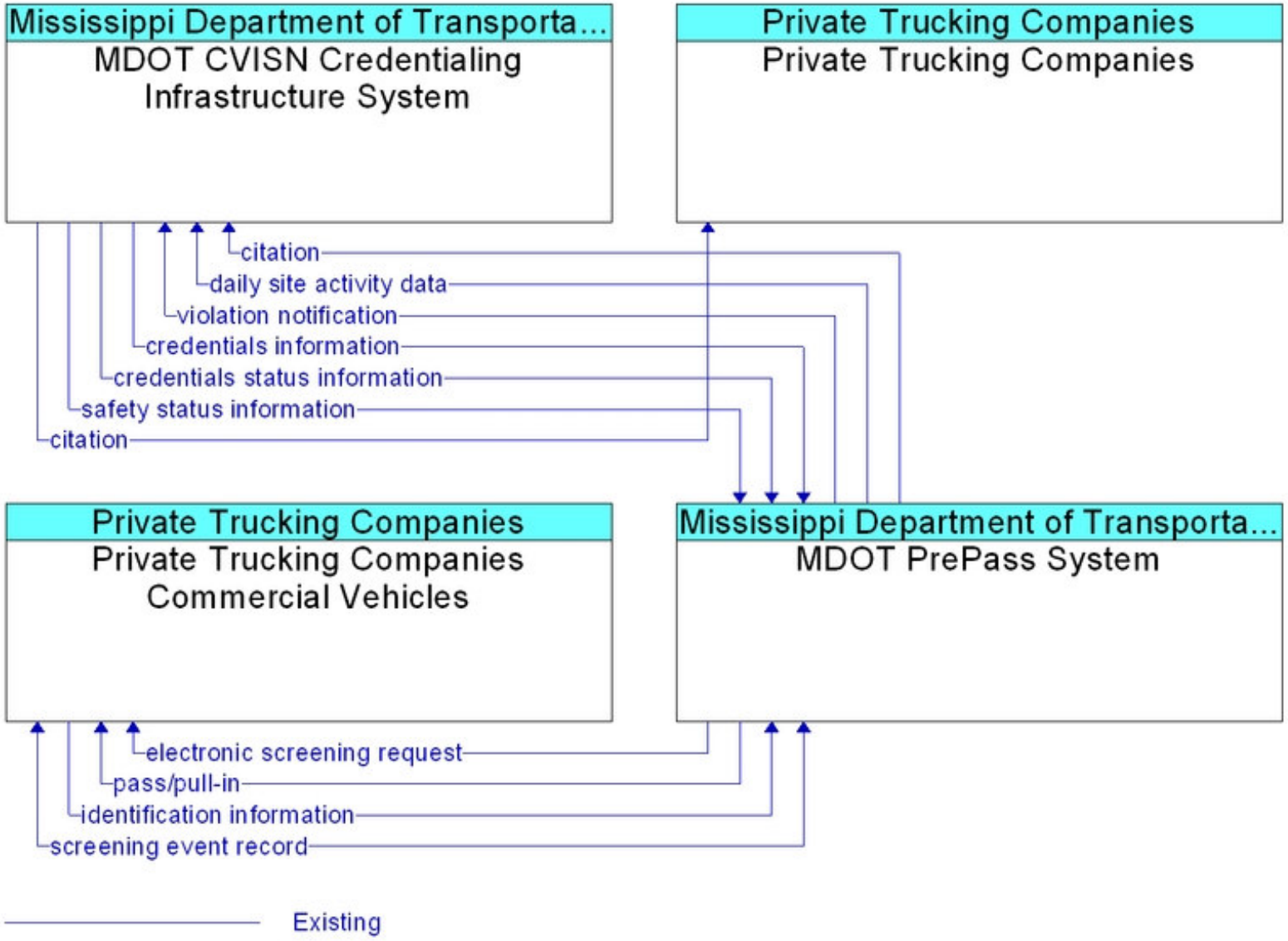
road network conditions
emergency traffic control request
emergency traffic control information
road network conditions
emergency traffic control request
Mississippi Department of Transporta...
MDOT Automated Gate Closure System
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT CCTV
barrier system control
barrier system status
video surveillance control
traffic images
emergency traffic control information
emergency traffic control request
roadway information system data
County Emergency Management Age...
County Emergency Operations Centers
Mississippi Department of Transporta...
MDOT Portable Dynamic Message Signs
Existing
Planned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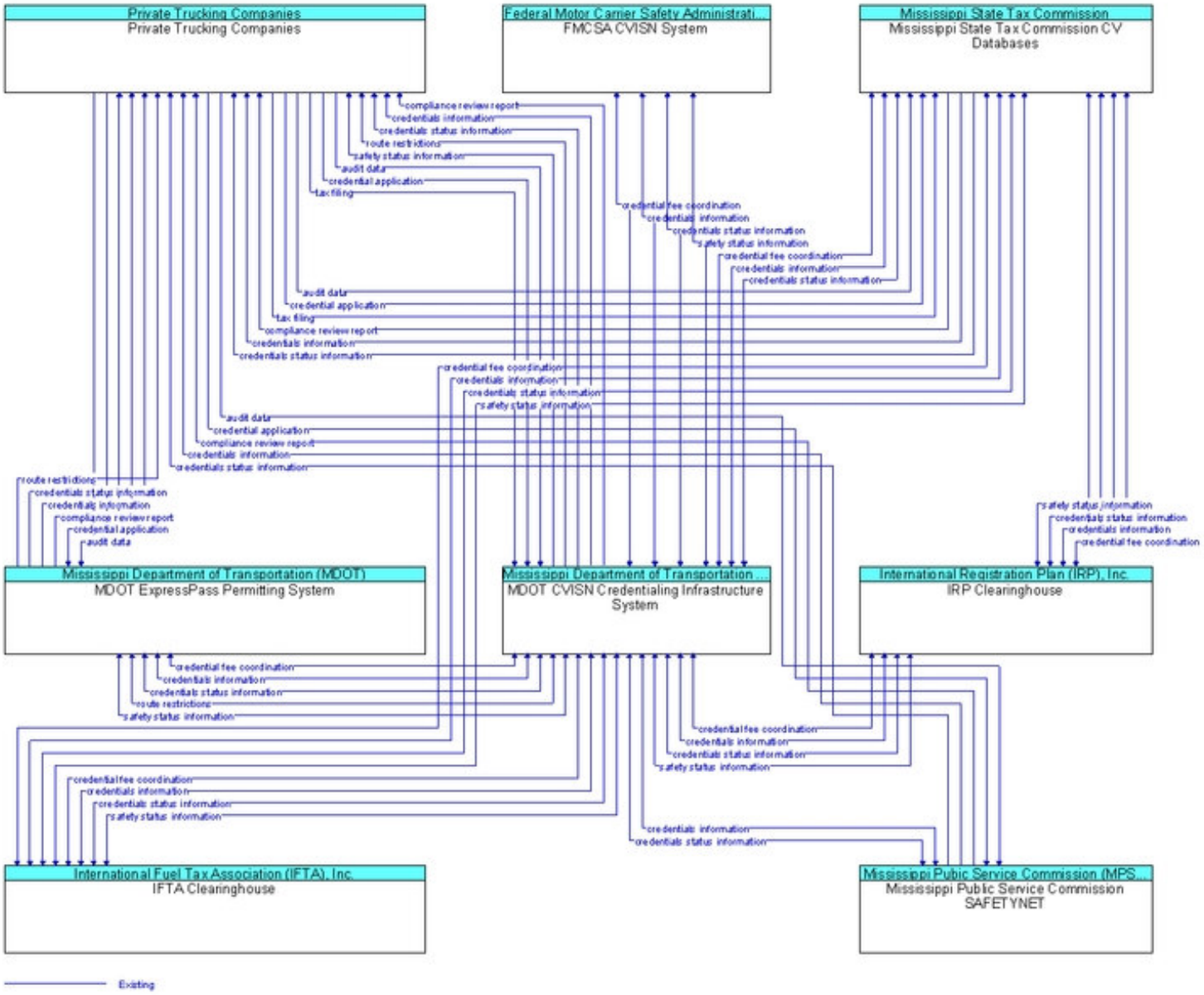
Private Trucking Companies
citation
daily site activity data
violation notification
credentials information
credentials status information
safety status information
citation
Private Trucking Companies
Private Trucking Companies Commercial Vehicles
Mississippi Department of Transporta...
MDOT PrePass System
electronic screening request
pass/pull-in
identification information
screening event record
Existing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Mississippi State Tax Commission
Mississippi State Tax Commission CV Databases
Mississippi Department of Transportation (MDOT)
MDOT ExpressPass Permitting System
Mississippi Department of Transportation ...
MDOT CVISN Credentialing Infrastructure System
International Registration Plan (IRP), Inc.
IRP Clearinghouse
International Fuel Tax Association (IFTA), Inc.
IFTA Clearinghouse
Mississippi Pubic Service Commission (MPS...
Mississippi Public Service Commission SAFETYNET
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credentials status information
route restrictions
safety status information
audit data
credential application
tax filing
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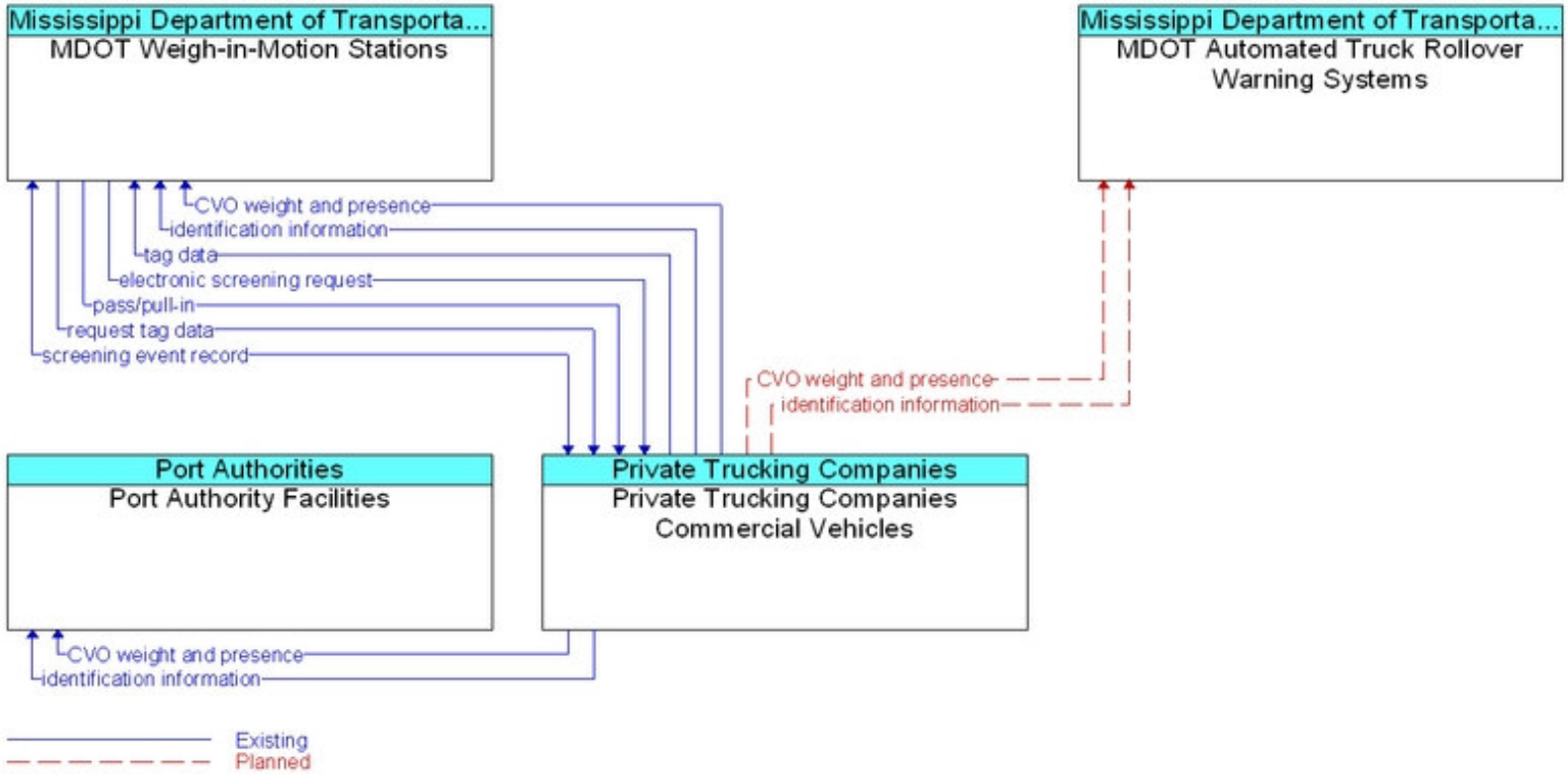
Existing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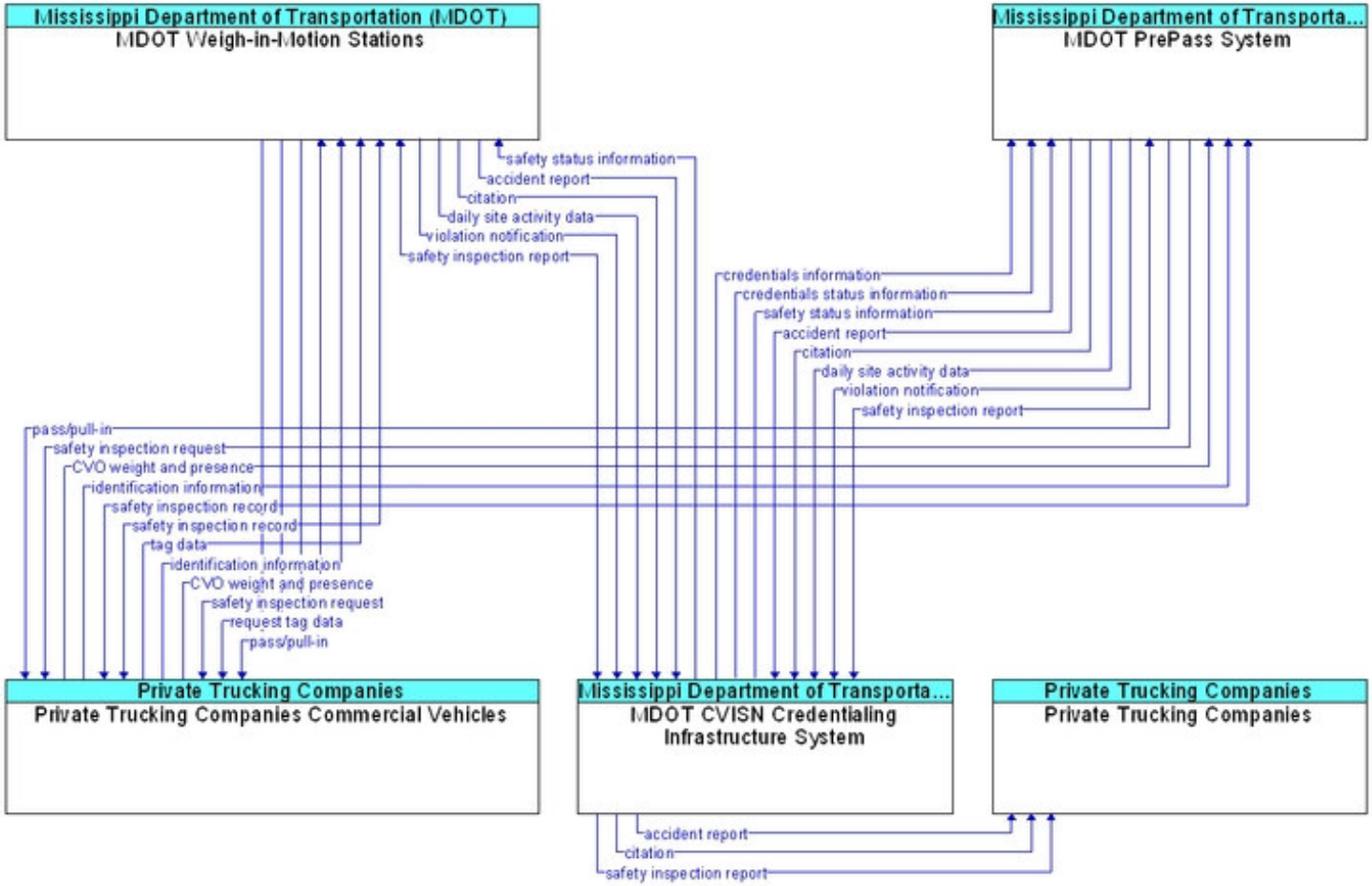
MDOT Weigh-in-Motion Stations
Mississippi Department of Transporta...
MDOT Automated Truck Rollover Warning Systems
CVO weight and presence
identification information
tag data
electronic screening request
pass/pull-in
request tag data
screening event record
CVO weight and presence
identification information
Port Authorities
Port Authority Facilities
Private Trucking Companies
Private Trucking Companies Commercial Vehicles
CVO weight and presence
identification information
Existing
Planned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MDOT Weigh-in-Motion Stations
Mississippi Department of Transporta...
MDOT PrePass System
safety status information
accident report
citation
daily site activity data
violation notification
safety inspection report
credentials information
credentials status information
safety status information
accident report
citation
daily site activity data
violation notification
safety inspection report
pass/pull-in
safety inspection request
CVO weight and presence
identification information
safety inspection record
safety inspection record
tag data
identification information
CVO weight and presence
safety inspection request
request tag data
pass/pull-in
Private Trucking Companies
Private Trucking Companies Commercial Vehicles
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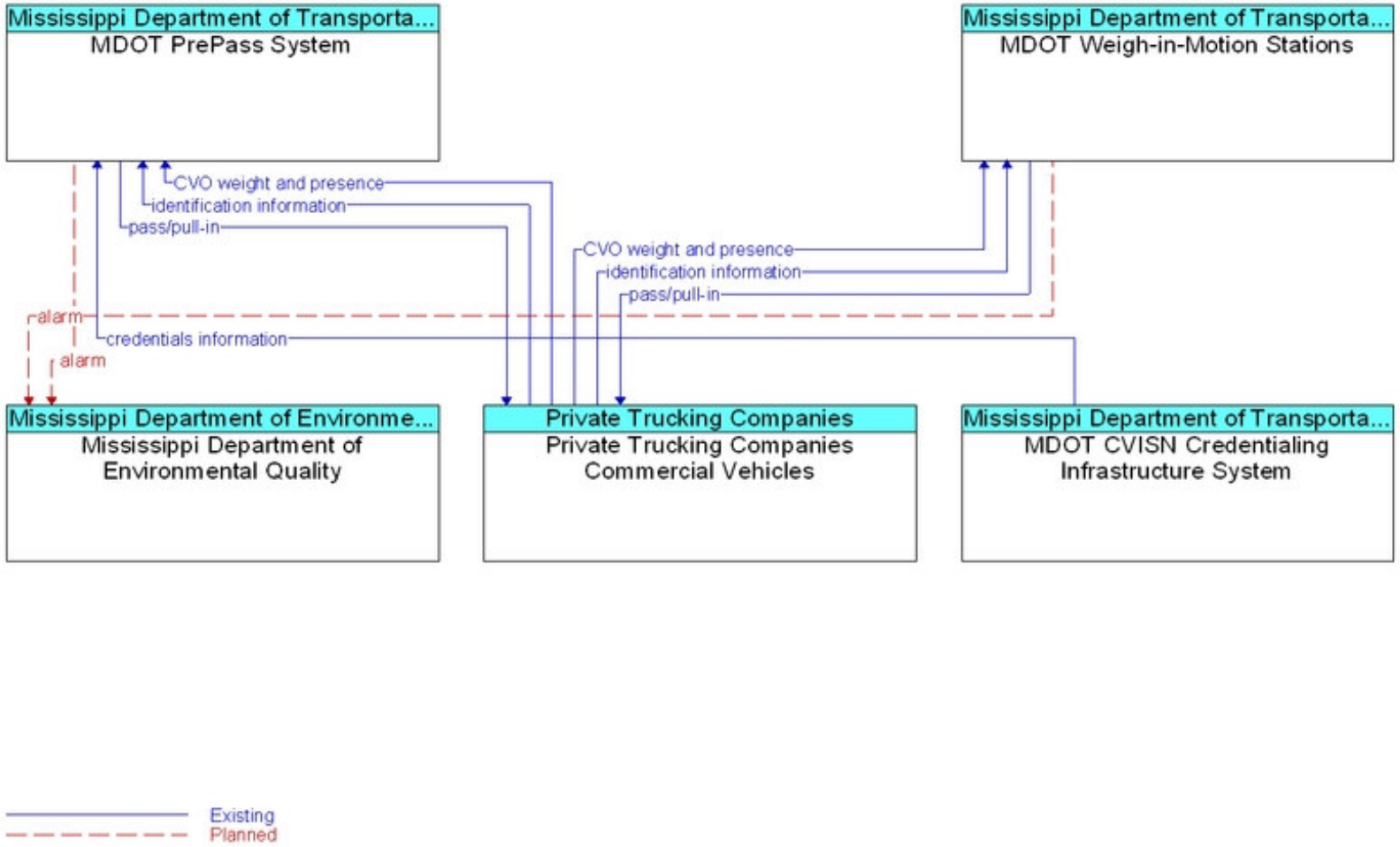
MDOT CVISN Credentialing Infrastructure System
Private Trucking Companies
Private Trucking Companies
accident report
citation
safety inspection report
Existing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MDOT PrePass System
Mississippi Department of Transporta...
MDOT Weigh-in-Motion Stations
CVO weight and presence
identification information
pass/pull-in
CVO weight and presence
identification information
pass/pull-in
alarm
credentials information
alarm
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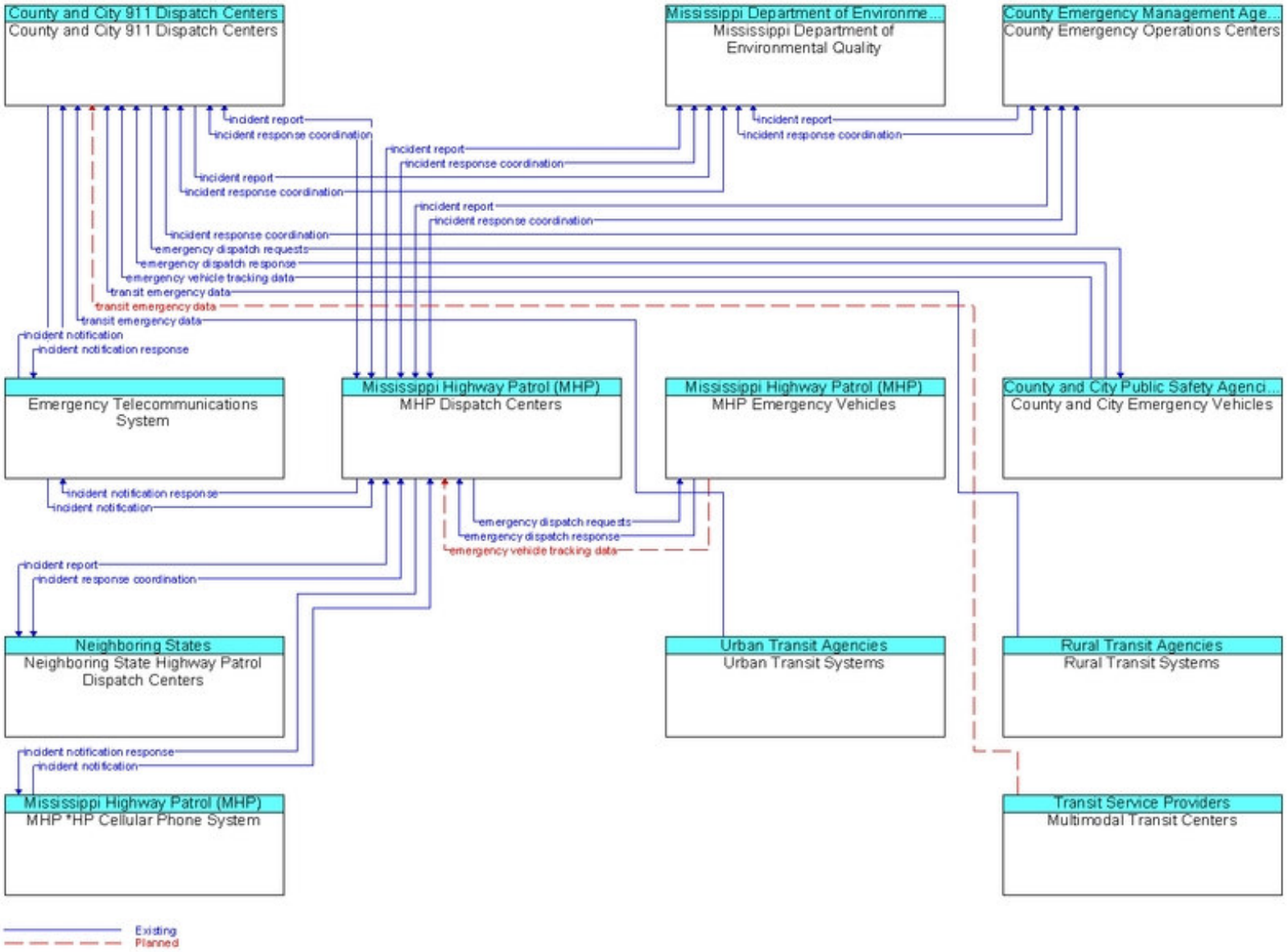
Private Trucking Companies
Private Trucking Companies Commercial Vehicles
Mississippi Department of Transporta...
MDOT CVISN Credentialing Infrastructure System
Existing
Planned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County and City 911 Dispatch Centers
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Mississippi Department of Environmental Quality
County Emergency Management Age...
County Emergency Operations Centers
incident report
incident response coordination
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incident response coordination
incident report
incident response coordination
incident report
incident response coordination
incident report
incident response coordination
incident response coordination
emergency dispatch requests
emergency dispatch response
emergency vehicle tracking data
transit emergency data
transit emergency data
transit emergency data
incident notification
incident notification response
Emergency Telecommunications System
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Mississippi Highway Patrol (MHP)
MHP Emergency Vehicles
County and City Public Safety Agenci...
County and City Emergency Vehicles
incident notification response
incident notification
emergency dispatch requests
emergency dispatch response
emergency vehicle tracking data
incident report
incident response coordination
Neighboring States
Neighboring State Highway Patrol Dispatch Centers
Urban Transit Agencies
Urban Transit Systems
Rural Transit Agencies
Rural Transit Systems
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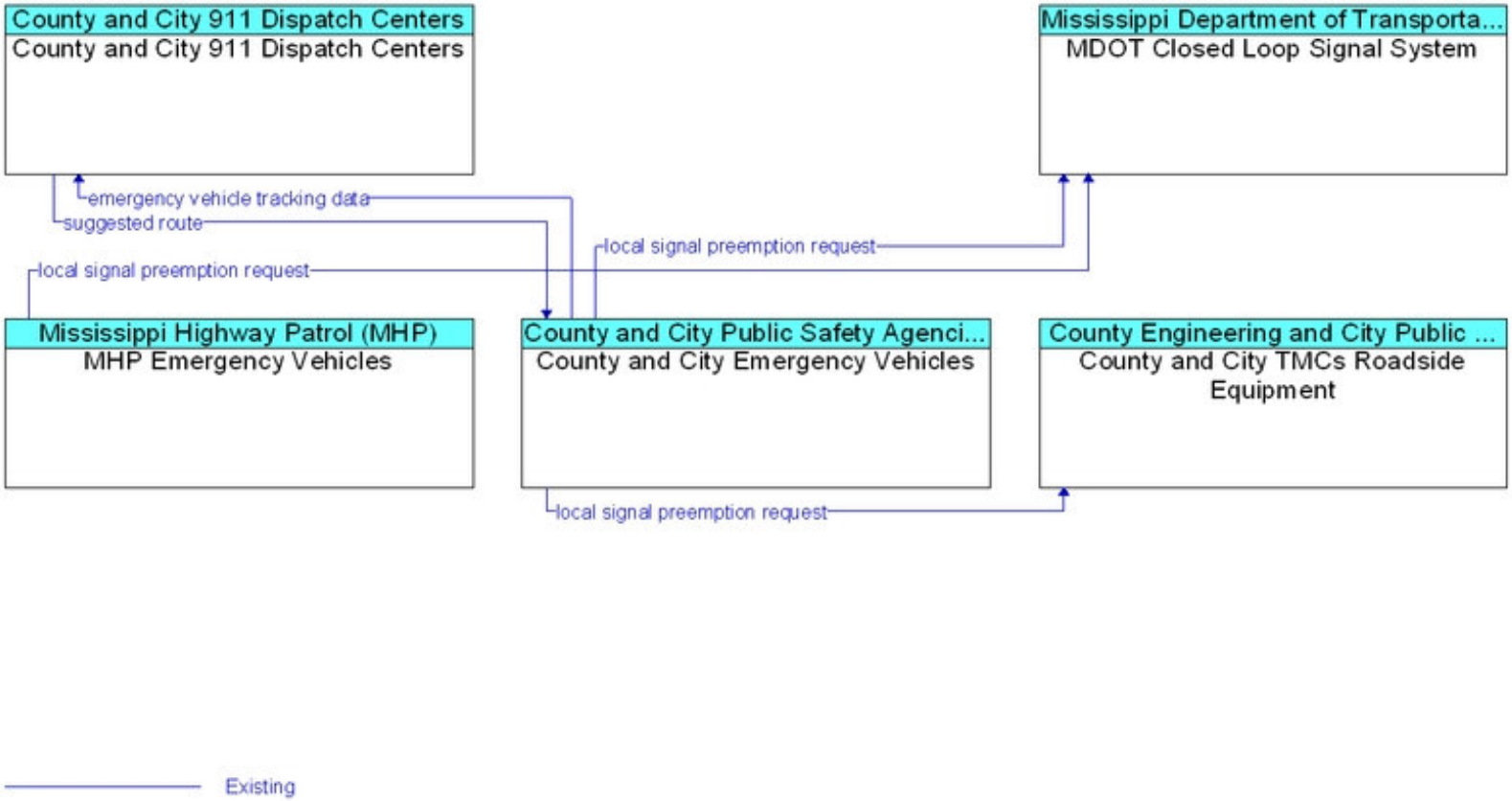
incident notification
Mississippi Highway Patrol (MHP)
MHP *HP Cellular Phone System
Transit Service Providers
Multimodal Transit Centers
Existing
Planned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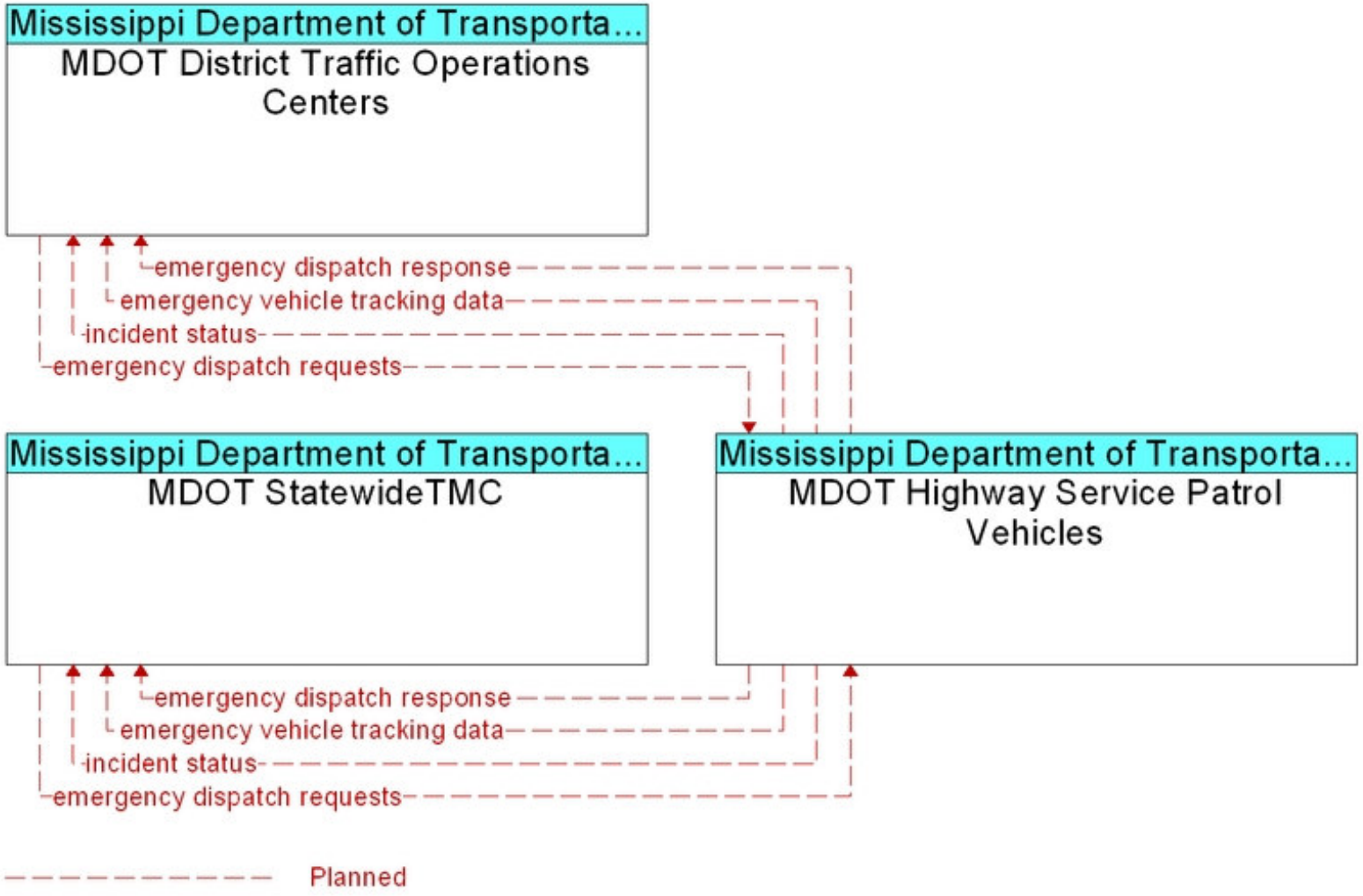
County and City 911 Dispatch Centers
Mississippi Department of Transporta...
MDOT Closed Loop Signal System
emergency vehicle tracking data
suggested route
local signal preemption request
local signal preemption request
Mississippi Highway Patrol (MHP)
MHP Emergency Vehicles
County and City Public Safety Agenci...
County and City Emergency Vehicles
County Engineering and City Public ...
County and City TMCs Roadside Equipment
local signal preemption request
Existing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MDOT District Traffic Operations Centers
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emergency vehicle tracking data
incident status
emergency dispatch requests
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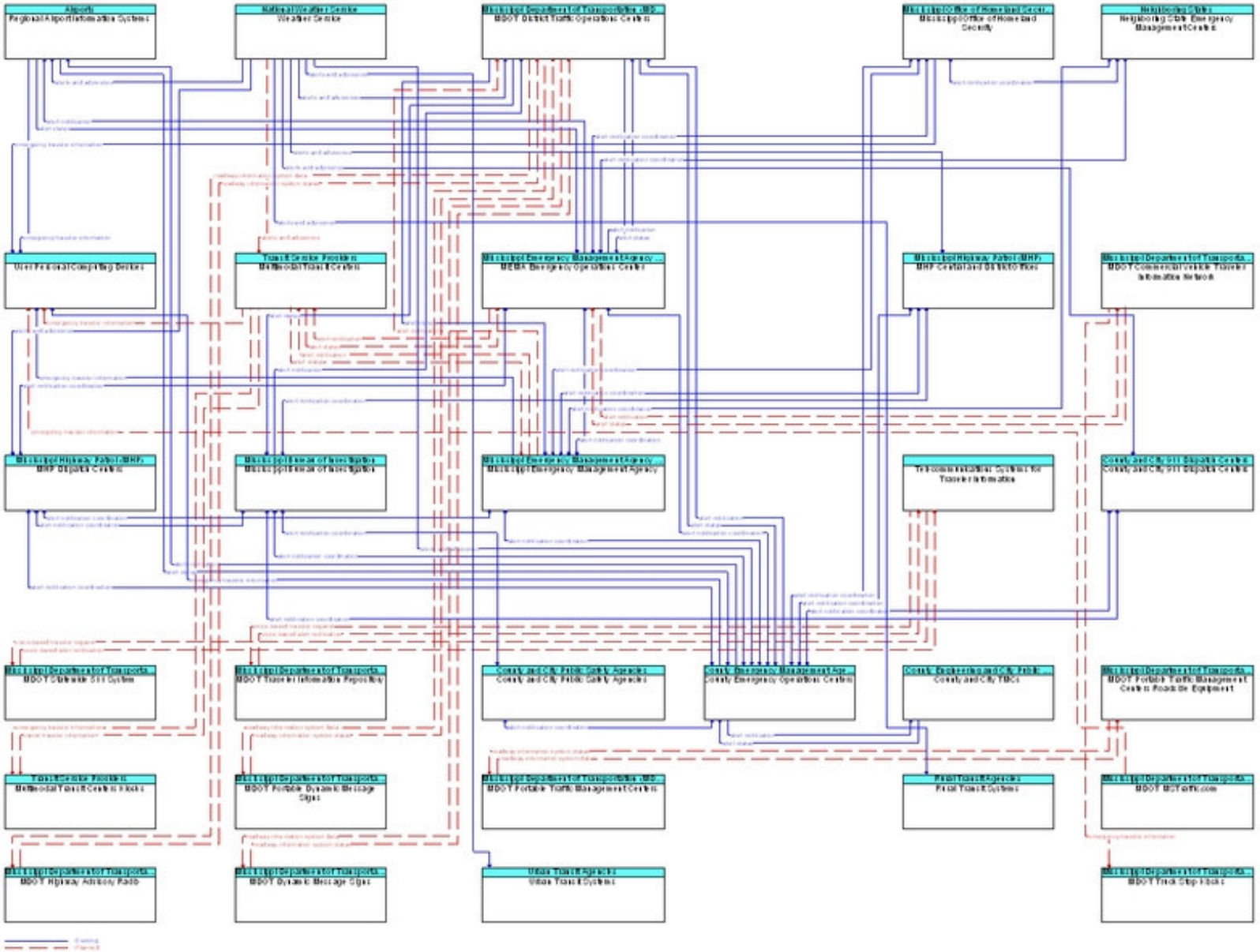
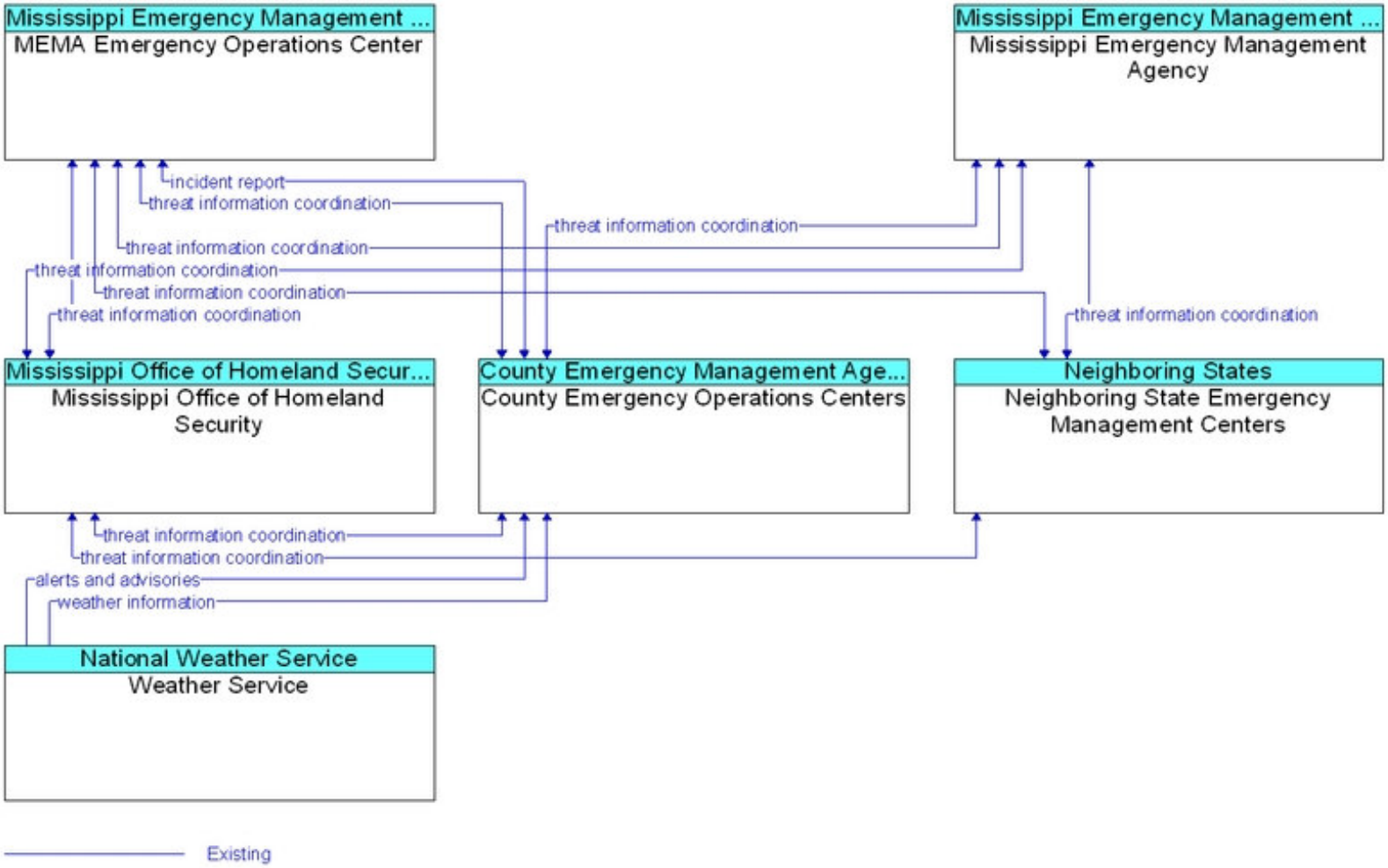
MDOT Highway Service Patrol Vehicles
emergency dispatch response
emergency vehicle tracking data
incident status
emergency dispatch requests
Planned

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MEMA Emergency Operations Center
Mississippi Emergency Management ...
Mississippi Emergency Management Agency
incident report
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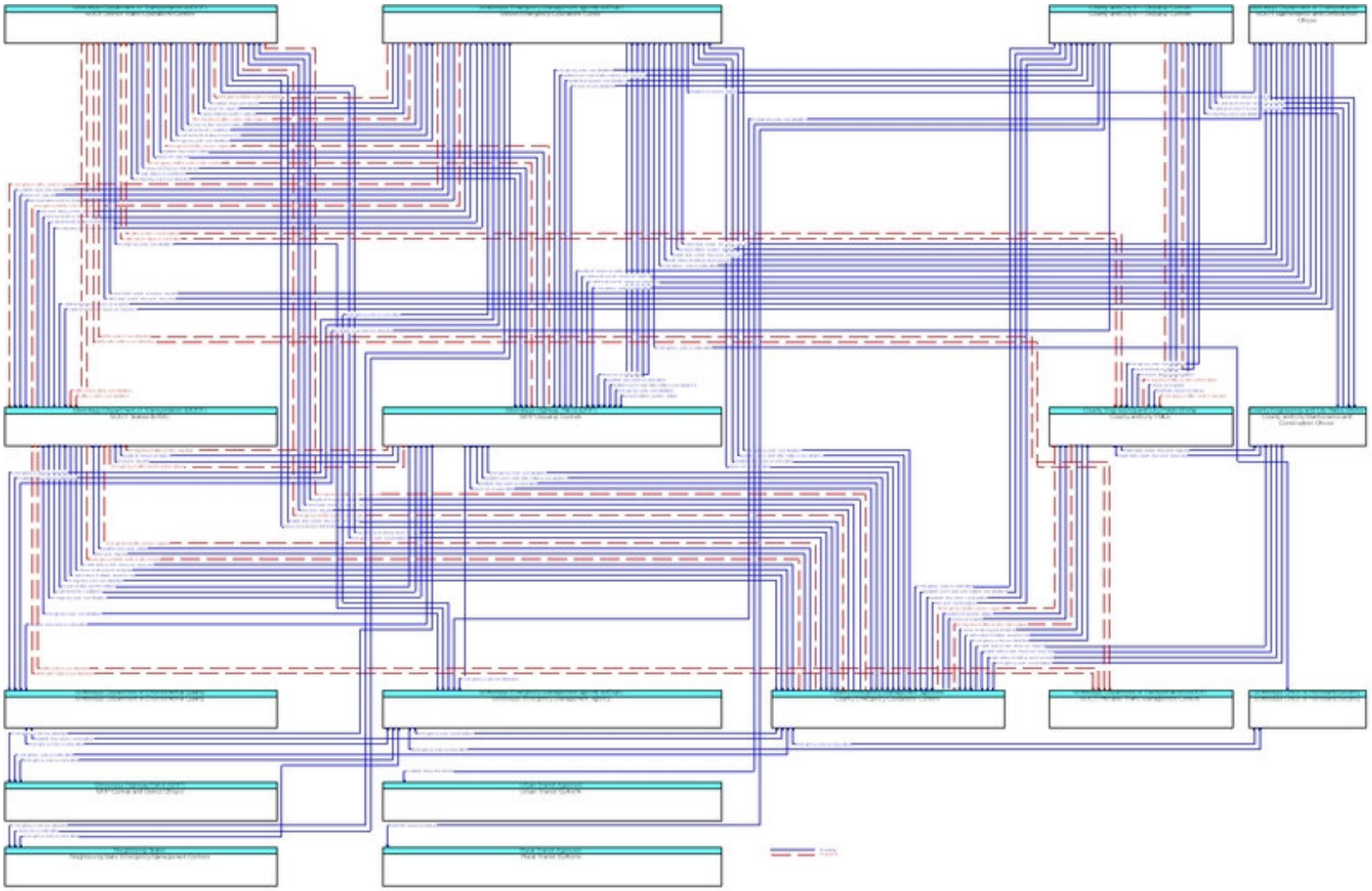
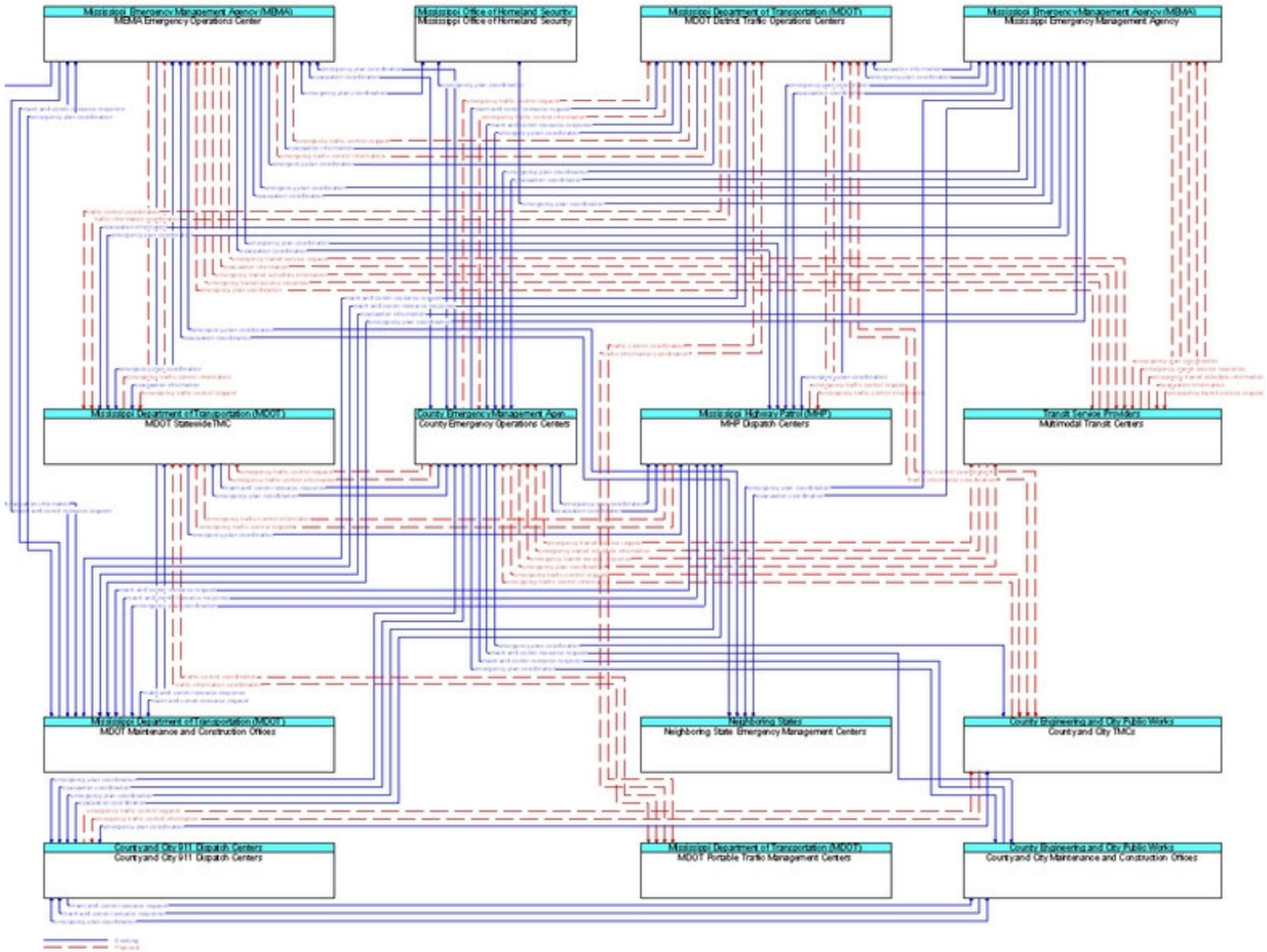
threat information coordination
threat information coordination
threat information coordination
threat information coordination
threat information coordination
threat information coordination
Mississippi Office of Homeland Secur...
Mississippi Office of Homeland Security
County Emergency Management Age...
County Emergency Operations Centers
Neighboring States
Neighboring State Emergency Management Centers
threat information coordination
threat information coordination
alerts and advisories
weather information
National Weather Service
Weather Service
Existing

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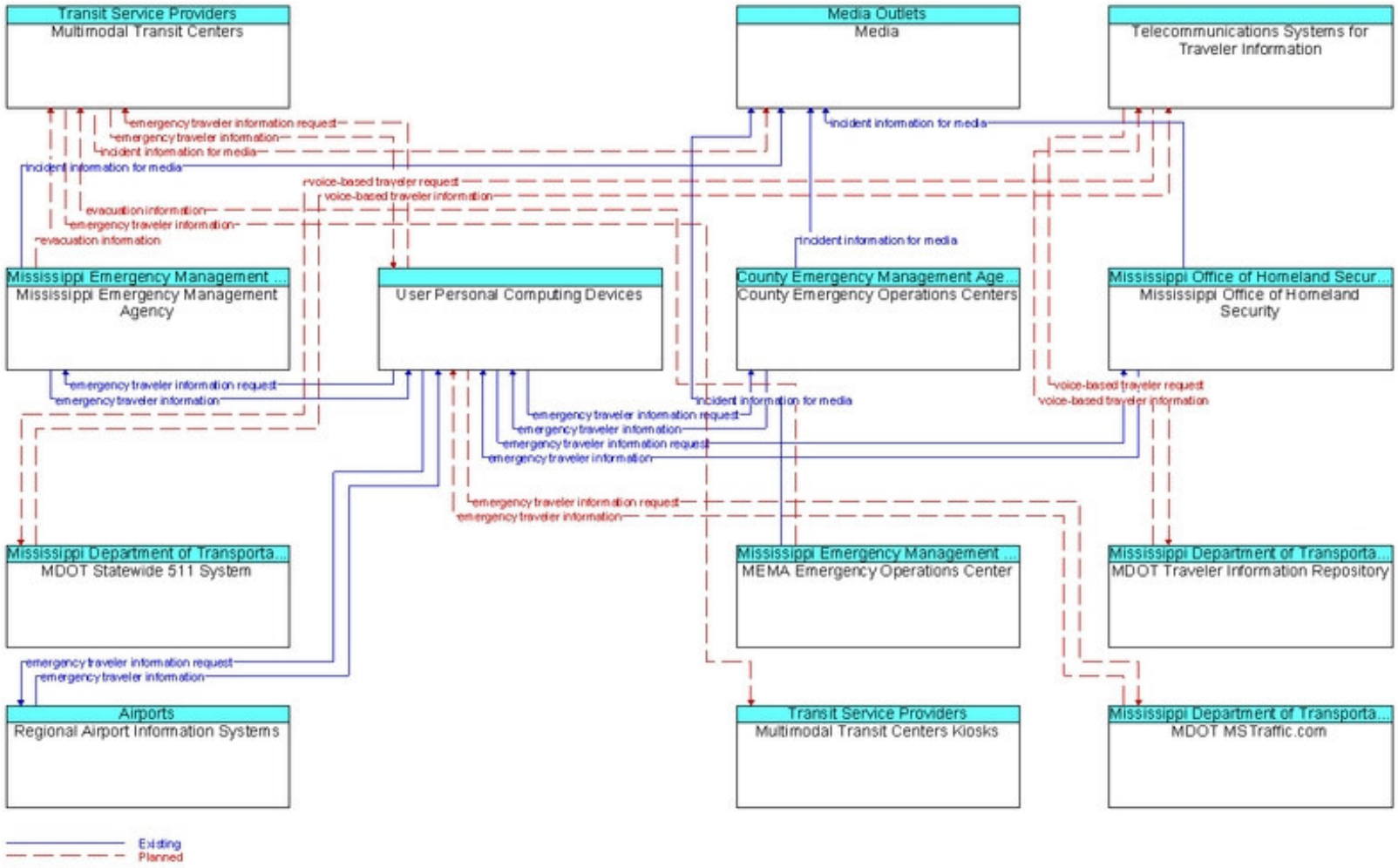
Mississippi Office of Homeland Security
Mississippi Office of Homeland Security
Mississippi Department of Transportation (MDOT)
MDOT District Traffic Operations Centers
Mississippi Emergency Management Agency (MEMA)
Mississippi Emergency Management Agency
Mississippi Department of Transportation (MDOT)
MDOT Statewide TMC
County Emergency Management Agen...
County Emergency Operations Centers
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Transit Service Providers
Multimodal Transit Centers
Mississippi Department of Transportation (MDOT)
MDOT Maintenance and Construction Offices
Neighboring States
Neighboring State Emergency Management Centers
County Engineering and City Public Works
County and City TMCs
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
Mississippi Department of Transportation (MDOT)
MDOT Portable Traffic Management Centers
County Engineering and City Public Works
County and City Maintenance and Construction Offices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Multimodal Transit Centers
Media Outlets
Media
Telecommunications Systems for Traveler Information
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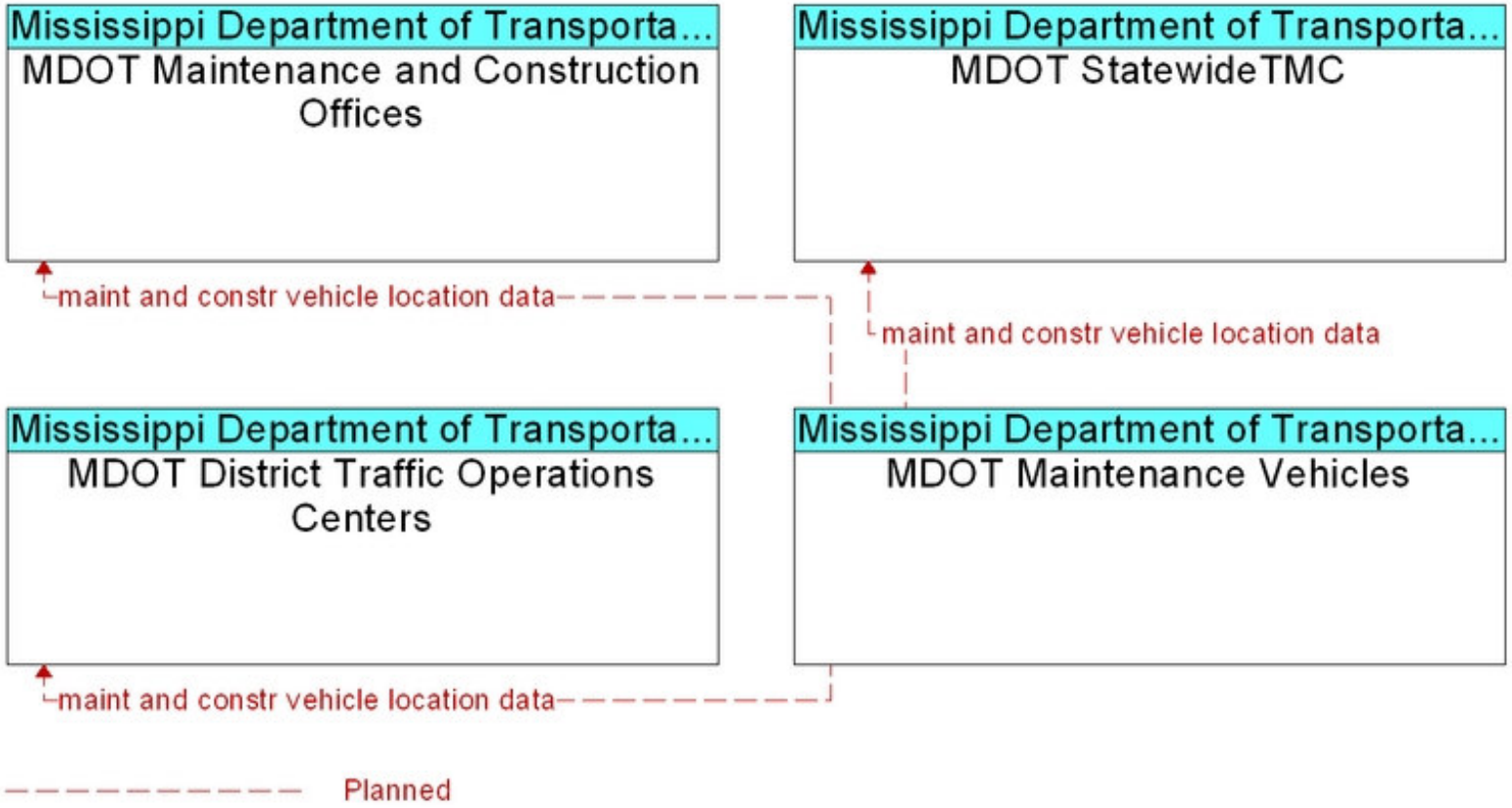
emergency traveler information
incident information for media
incident information for media
voice-based traveler request
voice-based traveler information
evacuation information
emergency traveler information
evacuation information
incident information for media
Mississippi Emergency Management ...
Mississippi Emergency Management Agency
User Personal Computing Devices
County Emergency Management Age...
County Emergency Operations Centers
Mississippi Office of Homeland Secur...
Mississippi Office of Homeland Security
emergency traveler information request
emergency traveler information
incident information for media
voice-based traveler request
voice-based traveler information
emergency traveler information request
emergency traveler information
emergency traveler information request
emergency traveler information
emergency traveler information request
emergency traveler information
Mississippi Department of Transporta...
MDOT Statewide 511 System
Mississippi Emergency Management ...
MEMA Emergency Operations Center
Mississippi Department of Transporta...
MDOT Traveler Information Repository
emergency traveler information request
emergency traveler information
Airports
Regional Airport Information Systems
Transit Service Providers
Multimodal Transit Centers Kiosks
Mississippi Department of Transporta...
MDOT MSTraffic.com
Existing
Planned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Mississippi Department of Transporta...
MDOT StatewideTMC
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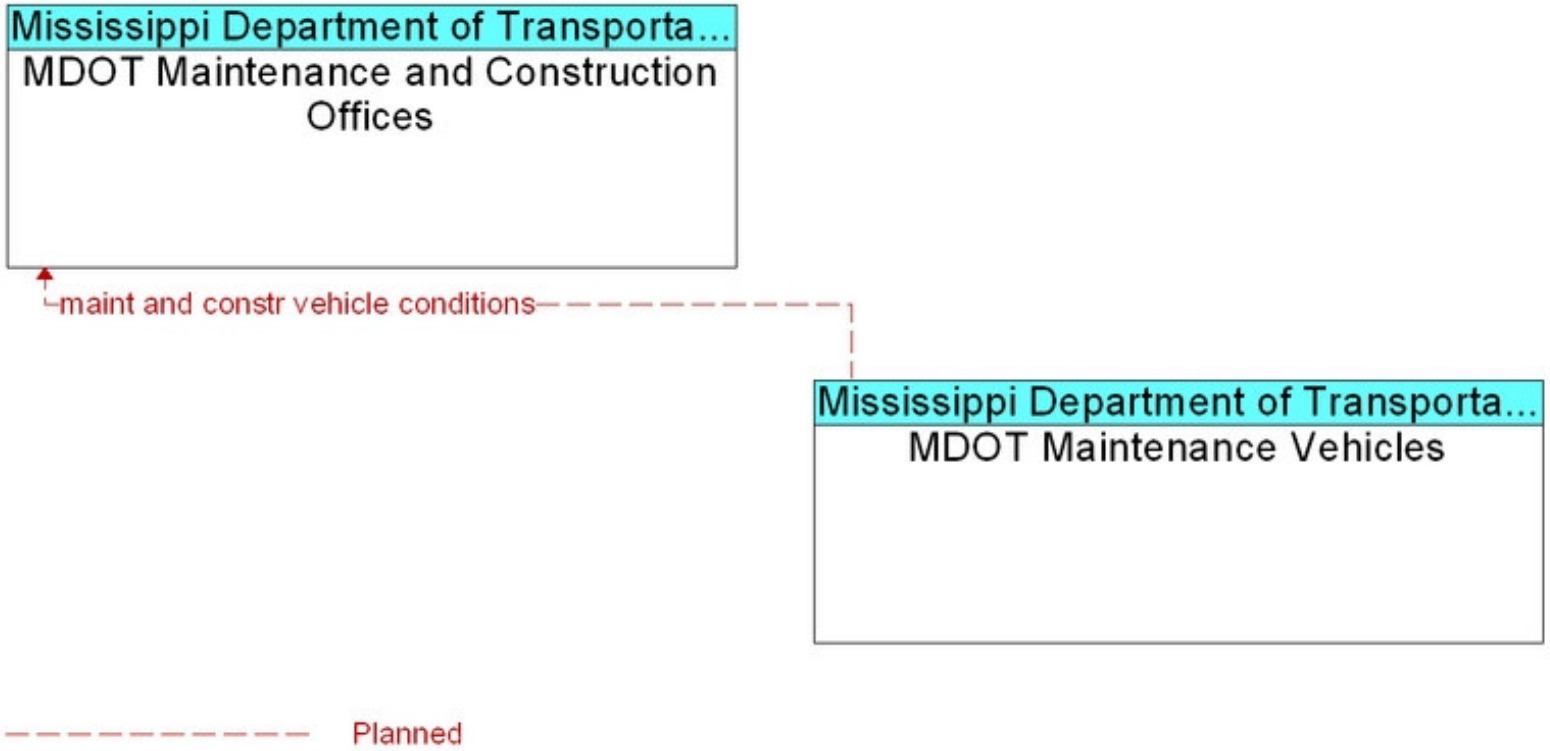
maint and constr vehicle location data
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
maint and constr vehicle location data
Planned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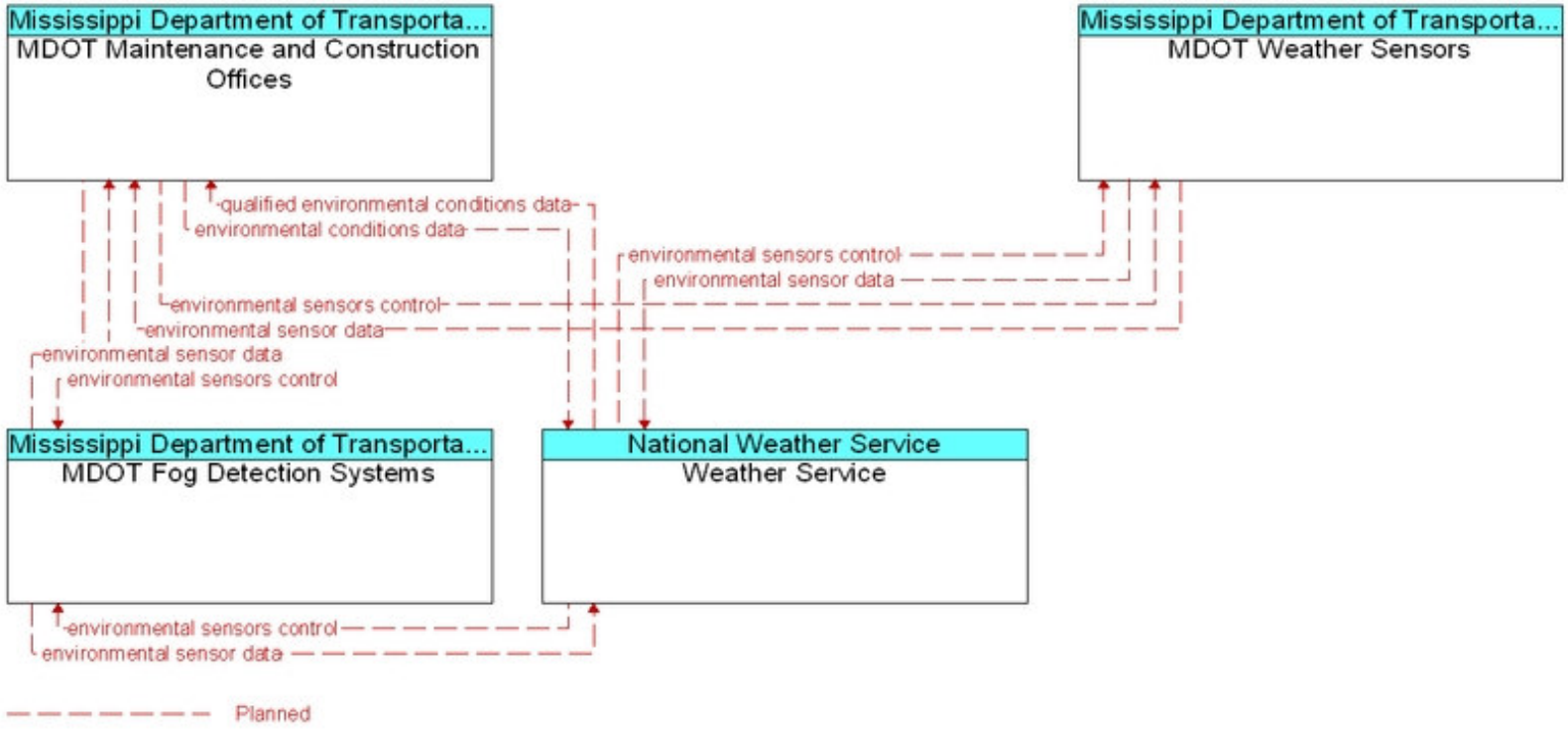
maint and constr vehicle conditions
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
Planned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MDOT Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT Weather Sensors
qualified environmental conditions data
environmental conditions data
environmental sensors control
environmental sensor data
environmental sensors control
environmental sensor data
environmental sensor data
environmental sensors control
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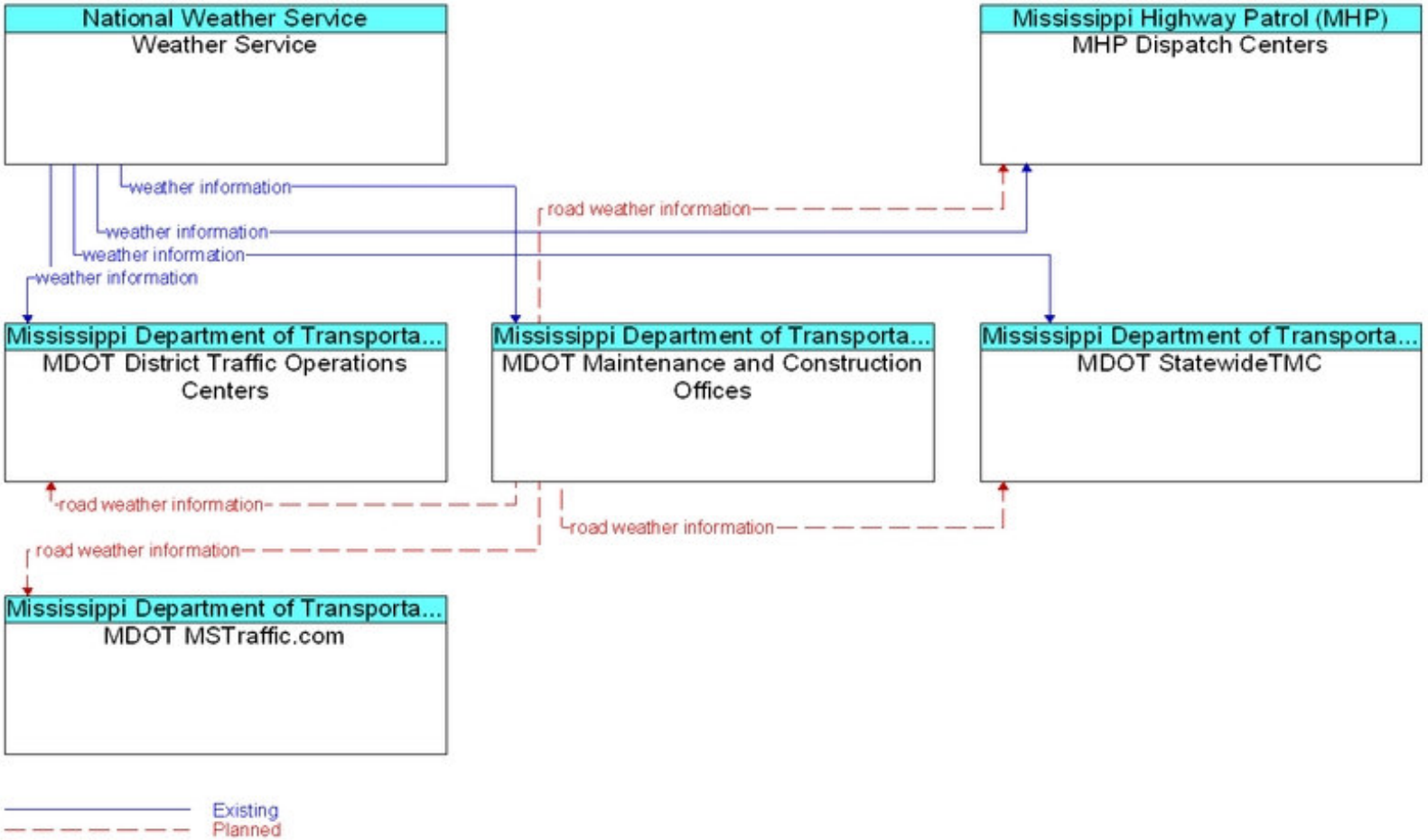
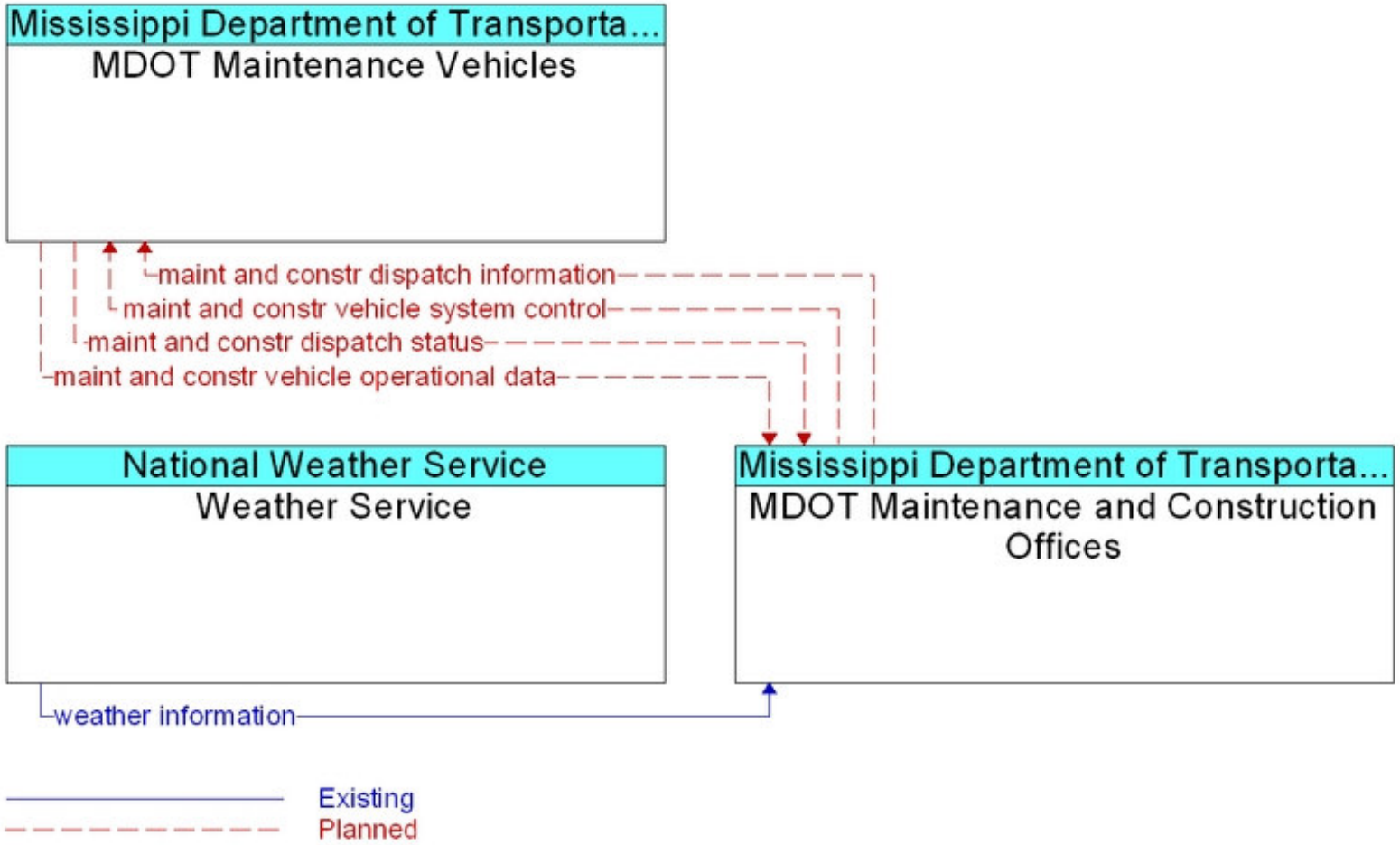
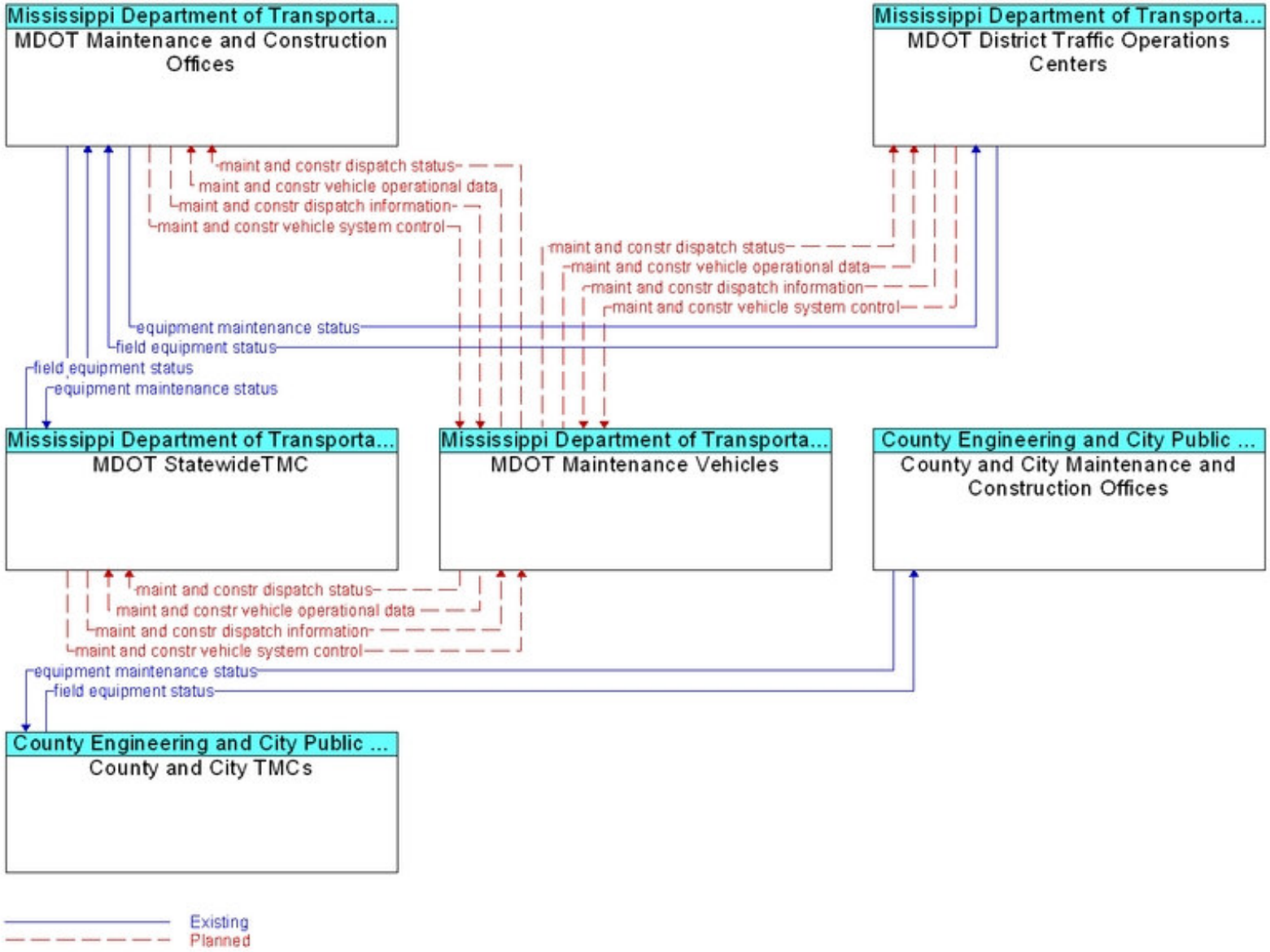
MDOT Fog Detection Systems
National Weather Service
Weather Service
environmental sensors control
environmental sensor data
Planned


National Weather Service
Weather Service
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
weather information
weather information
weather information
weather information
road weather information
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT StatewideTMC
road weather information
road weather information
road weather information
Mississippi Department of Transporta...
MDOT MSTraffic.com
Existing
Planned


Mississippi Department of Transporta...
MDOT Maintenance Vehicles
maint and constr dispatch information
maint and constr vehicle system control
maint and constr dispatch status
maint and constr vehicle operational data
National Weather Service
Weather Service
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
weather information
Existing
Planned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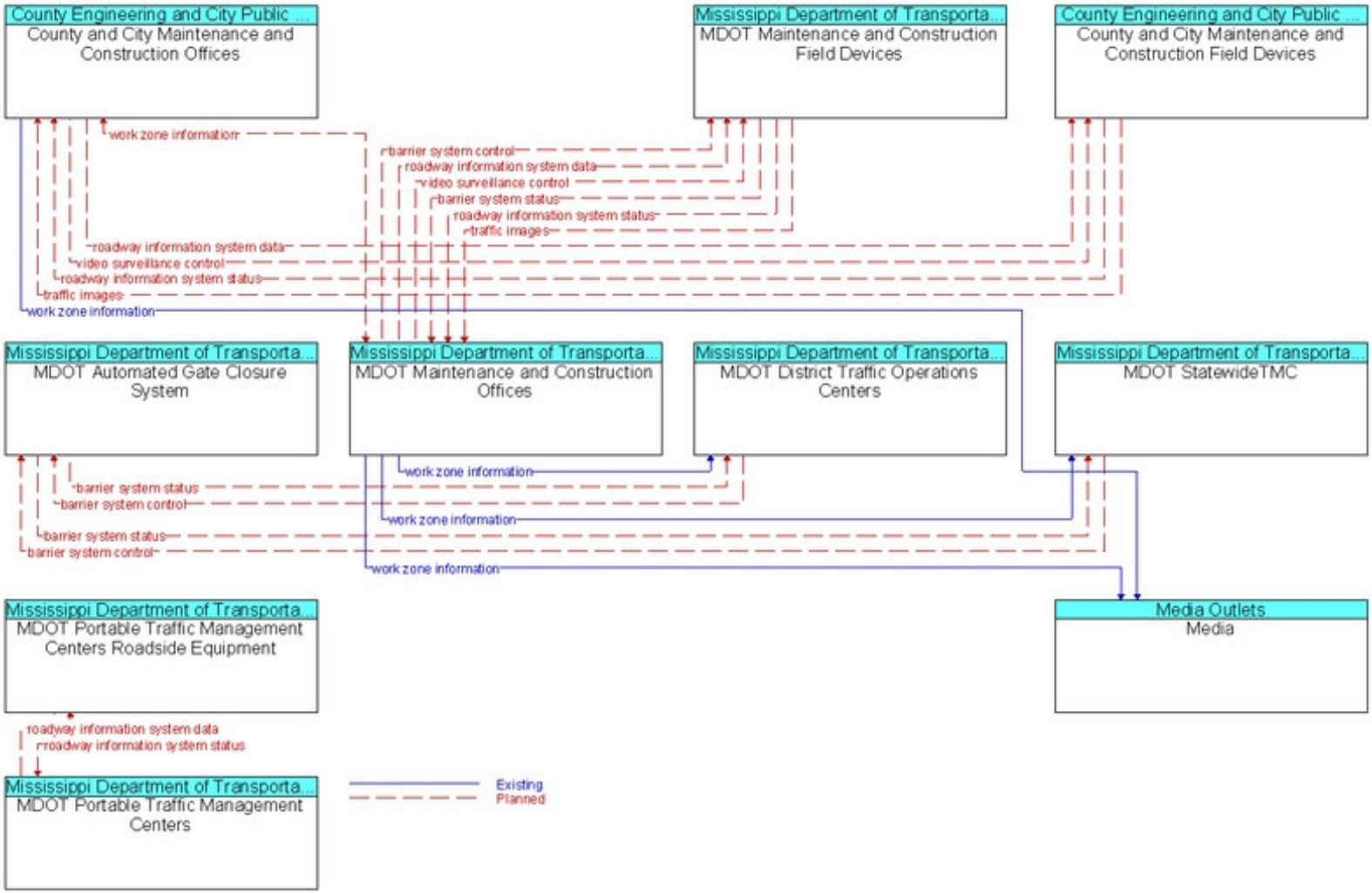
maint and constr vehicle operational data
maint and constr dispatch information
maint and constr vehicle system control
maint and constr dispatch status
maint and constr vehicle operational data
maint and constr dispatch information
maint and constr vehicle system control
equipment maintenance status
field equipment status
field equipment status
equipment maintenance status
Mississippi Department of Transporta...
MDOT StatewideTMC
Mississippi Department of Transporta...
MDOT Maintenance Vehicles
County Engineering and City Public ...
County and City Maintenance and Construction Offices
maint and constr dispatch status
maint and constr vehicle operational data
maint and constr dispatch information
maint and constr vehicle system control
equipment maintenance status
field equipment status
County Engineering and City Public ...
County and City TMCs
Existing
Planned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Mississippi Department of Transporta...
MDOT Maintenance and Construction Field Devices
County Engineering and City Public ...
County and City Maintenance and Construction Field Devices
work zone information
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roadway information system data
video surveillance control
barrier system status
roadway information system status
traffic images
roadway information system data
video surveillance control
roadway information system status
traffic images
work zone information
Mississippi Department of Transporta...
MDOT Automated Gate Closure System
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Department of Transporta...
MDOT StatewideTMC
work zone information
barrier system status
barrier system control
work zone information
barrier system status
barrier system control
work zone information
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers Roadside Equipment
Media Outlets
Media
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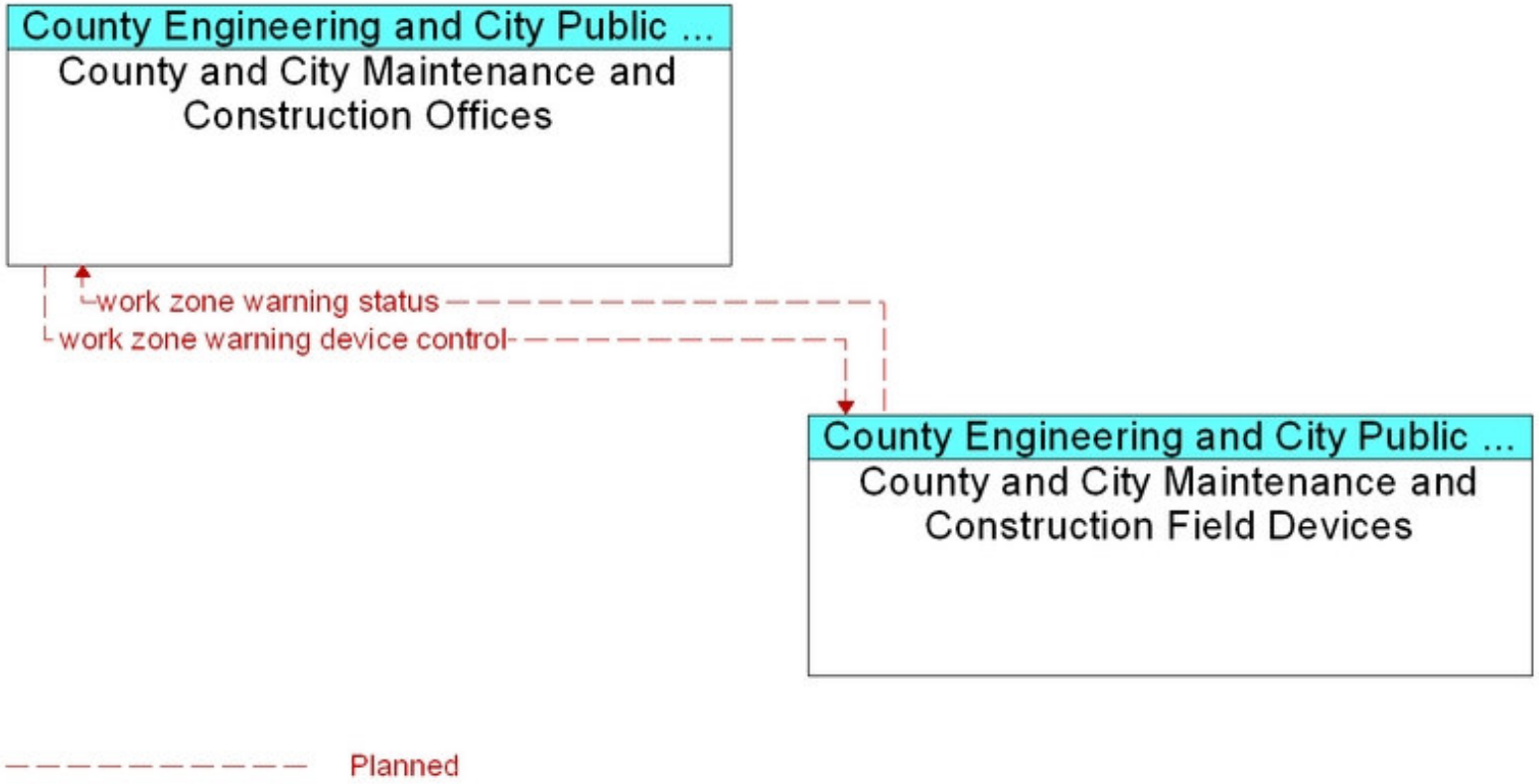
roadway information system status
Mississippi Department of Transporta...
MDOT Portable Traffic Management Centers
Existing
Planned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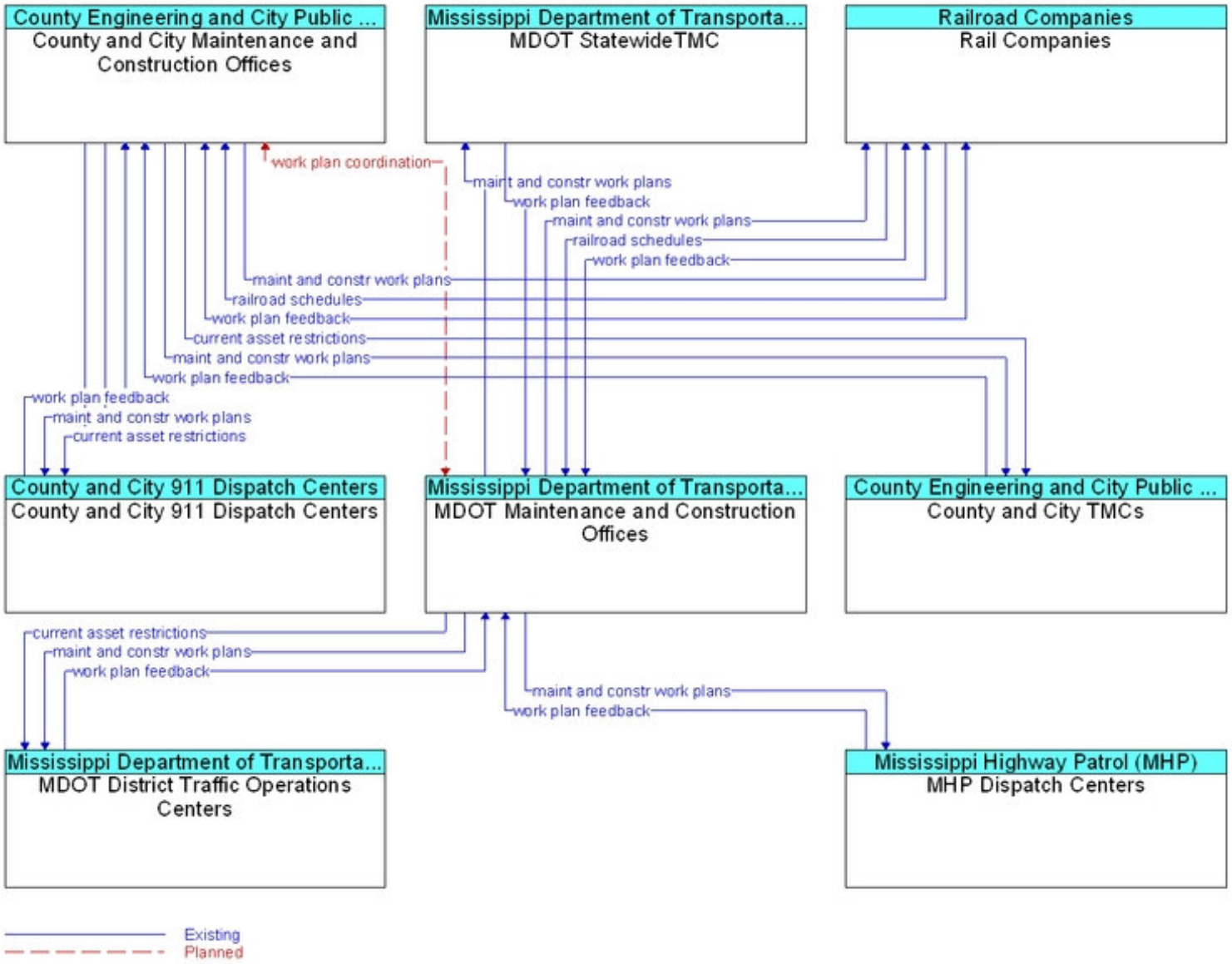
County Engineering and City Public ...
County and City Maintenance and Construction Field Devices
Planned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County and City Maintenance and Construction Offices
Mississippi Department of Transporta...
MDOT StatewideTMC
Railroad Companies
Rail Companies
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maint and constr work plans
work plan feedback
maint and constr work plans
railroad schedules
work plan feedback
maint and constr work plans
railroad schedules
work plan feedback
current asset restrictions
maint and constr work plans
work plan feedback
work plan feedback
maint and constr work plans
current asset restrictions
County and City 911 Dispatch Centers
County and City 911 Dispatch Centers
Mississippi Department of Transporta...
MDOT Maintenance and Construction Offices
County Engineering and City Public ...
County and City TMCs
current asset restrictions
maint and constr work plans
work plan feedback
maint and constr work plans
work plan feedback
Mississippi Department of Transporta...
MDOT District Traffic Operations Centers
Mississippi Highway Patrol (MHP)
MHP Dispatch Centers
Existing
Planned

Appendix E - Additions to MDOT Central ITS Architecture: Interconnects and Architectural Flows and Diagrams and Functional Requirements

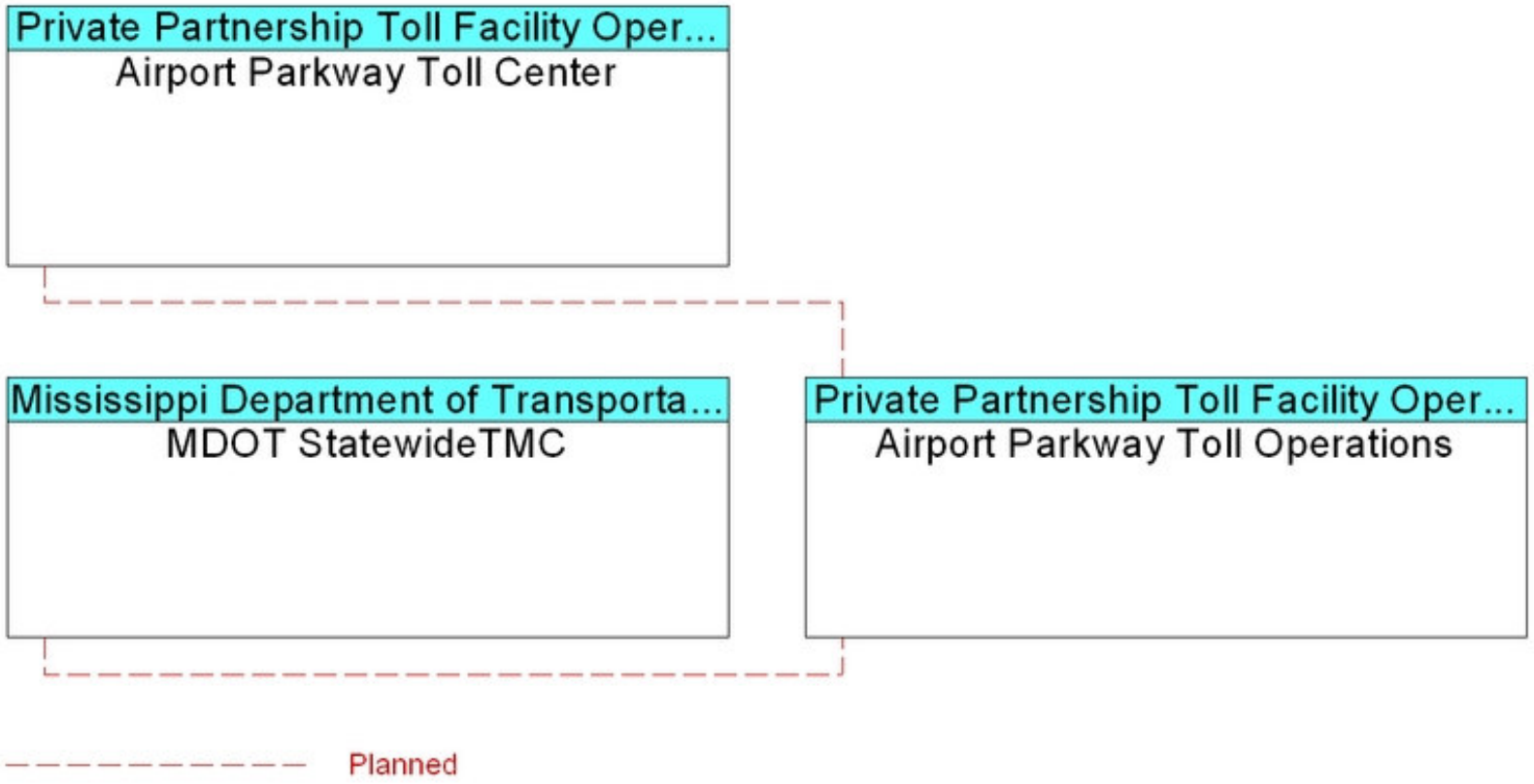
After making the necessary changes to the Turbo database and running the build utility in the Interconnects tab, the first set of tables contains the new Interconnects; the second table contains the new Flows The two diagrams reflect the new Interconnects and Flows as shown in the newly added Electronic Toll Collection User Service, ATMS10. The final table lists the new Functional Requirements for the Toll administration and operations for the Airport Parkway.

All Interconnects	
Element	Element
Airport Parkway Toll Center	Airport Parkway Toll Operations
Airport Parkway Toll Center	Driver
Airport Parkway Toll Center	MHP Emergency Vehicles
Airport Parkway Toll Operations	County and City 911 Dispatch Centers
Airport Parkway Toll Operations	County and City Databases
Airport Parkway Toll Operations	County and City Public Safety Agencies
Airport Parkway Toll Operations	County and City TMCs
Airport Parkway Toll Operations	MDOT MSTraffic.com
Airport Parkway Toll Operations	MDOT Statewide 511 System
Airport Parkway Toll Operations	MDOT StatewideTMC
Airport Parkway Toll Operations	Mississippi Road/Weather Conditions Website
Airport Parkway Toll Operations	MPO Databases
Airport Parkway Toll Operations	Regional Airport Information Systems
County and City 911 Dispatch Centers	County and City Maintenance and Construction Offices
County and City 911 Dispatch Centers	County and City TMCs
County and City 911 Dispatch Centers	County Emergency Operations Centers
County and City 911 Dispatch Centers	Multimodal Transit Centers
County and City Databases	County and City TMCs
County and City Databases	Multimodal Transit Centers
County and City Databases	Rural Transit Systems
County and City Databases	Urban Transit Systems
County and City Emergency Vehicles	County and City TMCs Roadside Equipment
County and City Maintenance and Construction Offices	County Emergency Operations Centers
County and City Public Safety Agencies	County Emergency Operations Centers
County and City Public Safety Agencies	National Park Service Center Natchez Trace Parkway
County and City Smart Parking Systems	Rural Transit Systems
County and City Smart Parking Systems	Urban Transit Systems
County and City TMCs	County Emergency Operations Centers
County and City TMCs	MDOT District Traffic Operations Centers
County and City TMCs	Multimodal Transit Centers
County and City TMCs	National Park Service Center Natchez Trace Parkway
County and City TMCs	Weather Service
County Emergency Operations Centers	MDOT District Traffic Operations Centers
County Emergency Operations Centers	MDOT StatewideTMC
County Emergency Operations Centers	MEMA Emergency Operations Center
County Emergency Operations Centers	MHP Central and District Offices
County Emergency Operations Centers	MHP Dispatch Centers
County Emergency Operations Centers	Mississippi Bureau of Investigation
County Emergency Operations Centers	Mississippi Department of Environmental Quality
County Emergency Operations Centers	Mississippi Emergency Management Agency
County Emergency Operations Centers	Mississippi Office of Homeland Security
County Emergency Operations Centers	Multimodal Transit Centers
County Emergency Operations Centers	Regional Airport Information Systems
County Emergency Operations Centers	Weather Service
FMCSA CVISN System	MDOT CVISN Credentialing Infrastructure System
IFTA Clearinghouse	MDOT CVISN Credentialing Infrastructure System
IFTA Clearinghouse	Mississippi State Tax Commission CV Databases

Intercity Transit Systems	Intercity Transit Traveler Information Systems
Intercity Transit Systems	Multimodal Transit Centers
Intercity Transit Systems	Regional Airport Information Systems
Intercity Transit Traveler Information Systems	Multimodal Transit Centers
Intercity Transit Traveler Information Systems	Rural Transit Systems
Intercity Transit Traveler Information Systems	Urban Transit Systems
IRP Clearinghouse	MDOT CVISN Credentialing Infrastructure System
IRP Clearinghouse	Mississippi State Tax Commission CV Databases
MDOT Commercial Vehicle Traveler Information Network	MDOT District Traffic Operations Centers
MDOT Commercial Vehicle Traveler Information Network	MDOT StatewideTMC
MDOT Commercial Vehicle Traveler Information Network	MEMA Emergency Operations Center
MDOT CVISN Credentialing Infrastructure System	MDOT ExpressPass Permitting System
MDOT CVISN Credentialing Infrastructure System	MDOT PrePass System
MDOT CVISN Credentialing Infrastructure System	MDOT Weigh-in-Motion Stations
MDOT CVISN Credentialing Infrastructure System	Mississippi Public Service Commission SAFETYNET
MDOT CVISN Credentialing Infrastructure System	Mississippi State Tax Commission CV Databases
MDOT CVISN Credentialing Infrastructure System	Private Trucking Companies
MDOT District Traffic Operations Centers	MDOT Highway Performance Monitoring System (HPMS)
MDOT District Traffic Operations Centers	MDOT Maintenance and Construction Offices
MDOT District Traffic Operations Centers	MDOT MSTraffic.com
MDOT District Traffic Operations Centers	MDOT Portable Traffic Management Centers
MDOT District Traffic Operations Centers	MDOT Statewide 511 System
MDOT District Traffic Operations Centers	MDOT StatewideTMC
MDOT District Traffic Operations Centers	MDOT Traveler Information Repository
MDOT District Traffic Operations Centers	MEMA Emergency Operations Center
MDOT District Traffic Operations Centers	MHP Dispatch Centers
MDOT District Traffic Operations Centers	Mississippi Bureau of Investigation
MDOT District Traffic Operations Centers	Mississippi Emergency Management Agency
MDOT District Traffic Operations Centers	MPO Databases
MDOT District Traffic Operations Centers	National Park Service Center Natchez Trace Parkway
MDOT District Traffic Operations Centers	Weather Service
MDOT ExpressPass Permitting System	Private Trucking Companies
MDOT Highway Performance Monitoring System (HPMS)	MDOT StatewideTMC
MDOT Highway Performance Monitoring System (HPMS)	MDOT Traffic Sensors
MDOT Maintenance and Construction Offices	MDOT MSTraffic.com
MDOT Maintenance and Construction Offices	MDOT Statewide 511 System
MDOT Maintenance and Construction Offices	MDOT StatewideTMC
MDOT Maintenance and Construction Offices	MDOT Traveler Information Repository
MDOT Maintenance and Construction Offices	MEMA Emergency Operations Center
MDOT Maintenance and Construction Offices	MHP Dispatch Centers
MDOT Maintenance and Construction Offices	Mississippi Emergency Management Agency
MDOT Maintenance and Construction Offices	Weather Service
MDOT MSTraffic.com	MDOT StatewideTMC
MDOT Portable Traffic Management Centers	MDOT StatewideTMC

MDOT Statewide 511 System	MDOT StatewideTMC
MDOT Statewide 511 System	Rural Transit Systems
MDOT Statewide 511 System	Urban Transit Systems
MDOT Statewide 511 System	Weather Service
MDOT StatewideTMC	MDOT Traveler Information Repository
MDOT StatewideTMC	MEMA Emergency Operations Center
MDOT StatewideTMC	MHP Dispatch Centers
MDOT StatewideTMC	Mississippi Bureau of Investigation
MDOT StatewideTMC	Mississippi Emergency Management Agency
MDOT StatewideTMC	MPO Databases
MDOT StatewideTMC	National Park Service Center Natchez Trace Parkway
MDOT StatewideTMC	Weather Service
MDOT Traveler Information Repository	Rural Transit Systems
MDOT Traveler Information Repository	Urban Transit Systems
MDOT Traveler Information Repository	Weather Service
MEMA Emergency Operations Center	Mississippi Emergency Management Agency
MEMA Emergency Operations Center	Mississippi Office of Homeland Security
MEMA Emergency Operations Center	Multimodal Transit Centers
MEMA Emergency Operations Center	Regional Airport Information Systems
MHP Central and District Offices	Mississippi Emergency Management Agency
MHP Dispatch Centers	Mississippi Emergency Management Agency
Mississippi Department of Environmental Quality	Mississippi Emergency Management Agency
Mississippi Emergency Management Agency	Mississippi Office of Homeland Security
Mississippi Emergency Management Agency	Multimodal Transit Centers
Mississippi Public Service Commission SAFETYNET	Private Trucking Companies
Mississippi State Tax Commission CV Databases	Private Trucking Companies
Multimodal Transit Centers	Urban Transit Systems
Multimodal Transit Centers	Weather Service
Regional Airport Information Systems	Rural Transit Systems
Regional Airport Information Systems	Urban Transit Systems
Regional Airport Information Systems	Weather Service

All Architecture Flows		
Source Element	Flow Name	Destination Element
Airport Parkway Toll Center	toll transactions	Airport Parkway Toll Operations
Airport Parkway Toll Center	roadside transaction status	Driver
Airport Parkway Toll Center	request tag data	MHP Emergency Vehicles
Airport Parkway Toll Center	tag update	MHP Emergency Vehicles
Airport Parkway Toll Operations	toll instructions	Airport Parkway Toll Center
Airport Parkway Toll Operations	alert status	County and City 911 Dispatch Centers
Airport Parkway Toll Operations	toll service change response	County and City 911 Dispatch Centers
Airport Parkway Toll Operations	toll archive data	County and City Databases
Airport Parkway Toll Operations	alert status	County and City Public Safety Agencies
Airport Parkway Toll Operations	payment violation notification	County and City Public Safety Agencies
Airport Parkway Toll Operations	toll service change response	County and City Public Safety Agencies
Airport Parkway Toll Operations	toll probe data	County and City TMCs
Airport Parkway Toll Operations	toll service change response	County and City TMCs
Airport Parkway Toll Operations	toll data	MDOT MSTraffic.com
Airport Parkway Toll Operations	toll probe data	MDOT MSTraffic.com
Airport Parkway Toll Operations	toll data	MDOT Statewide 511 System
Airport Parkway Toll Operations	toll probe data	MDOT Statewide 511 System
Airport Parkway Toll Operations	toll data	MDOT StatewideTMC
Airport Parkway Toll Operations	toll probe data	MDOT StatewideTMC
Airport Parkway Toll Operations	toll service change response	MDOT StatewideTMC
Airport Parkway Toll Operations	toll data	Mississippi Road/Weather Conditions Website
Airport Parkway Toll Operations	toll probe data	Mississippi Road/Weather Conditions Website
Airport Parkway Toll Operations	toll archive data	MPO Databases
Airport Parkway Toll Operations	alert status	Regional Airport Information Systems
Airport Parkway Toll Operations	toll data	Regional Airport Information Systems
Airport Parkway Toll Operations	toll probe data	Regional Airport Information Systems
Airport Parkway Toll Operations	toll service change response	Regional Airport Information Systems
County and City 911 Dispatch Centers	alert notification	Airport Parkway Toll Operations
County and City 911 Dispatch Centers	toll service change request	Airport Parkway Toll Operations
County and City Databases	archive requests	Airport Parkway Toll Operations
County and City Databases	archive status	Airport Parkway Toll Operations
County and City Public Safety Agencies	alert notification	Airport Parkway Toll Operations
County and City Public Safety Agencies	toll service change request	Airport Parkway Toll Operations
County and City TMCs	toll service change request	Airport Parkway Toll Operations
MDOT MSTraffic.com	toll data request	Airport Parkway Toll Operations
MDOT Statewide 511 System	toll data request	Airport Parkway Toll Operations
MDOT StatewideTMC	toll data request	Airport Parkway Toll Operations
MDOT StatewideTMC	toll service change request	Airport Parkway Toll Operations
MHP Emergency Vehicles	tag data	Airport Parkway Toll Center
Mississippi Road/Weather Conditions Website	toll data request	Airport Parkway Toll Operations
MPO Databases	archive requests	Airport Parkway Toll Operations
MPO Databases	archive status	Airport Parkway Toll Operations
Regional Airport Information Systems	alert notification	Airport Parkway Toll Operations
Regional Airport Information Systems	toll data request	Airport Parkway Toll Operations
Regional Airport Information Systems	toll service change request	Airport Parkway Toll Operations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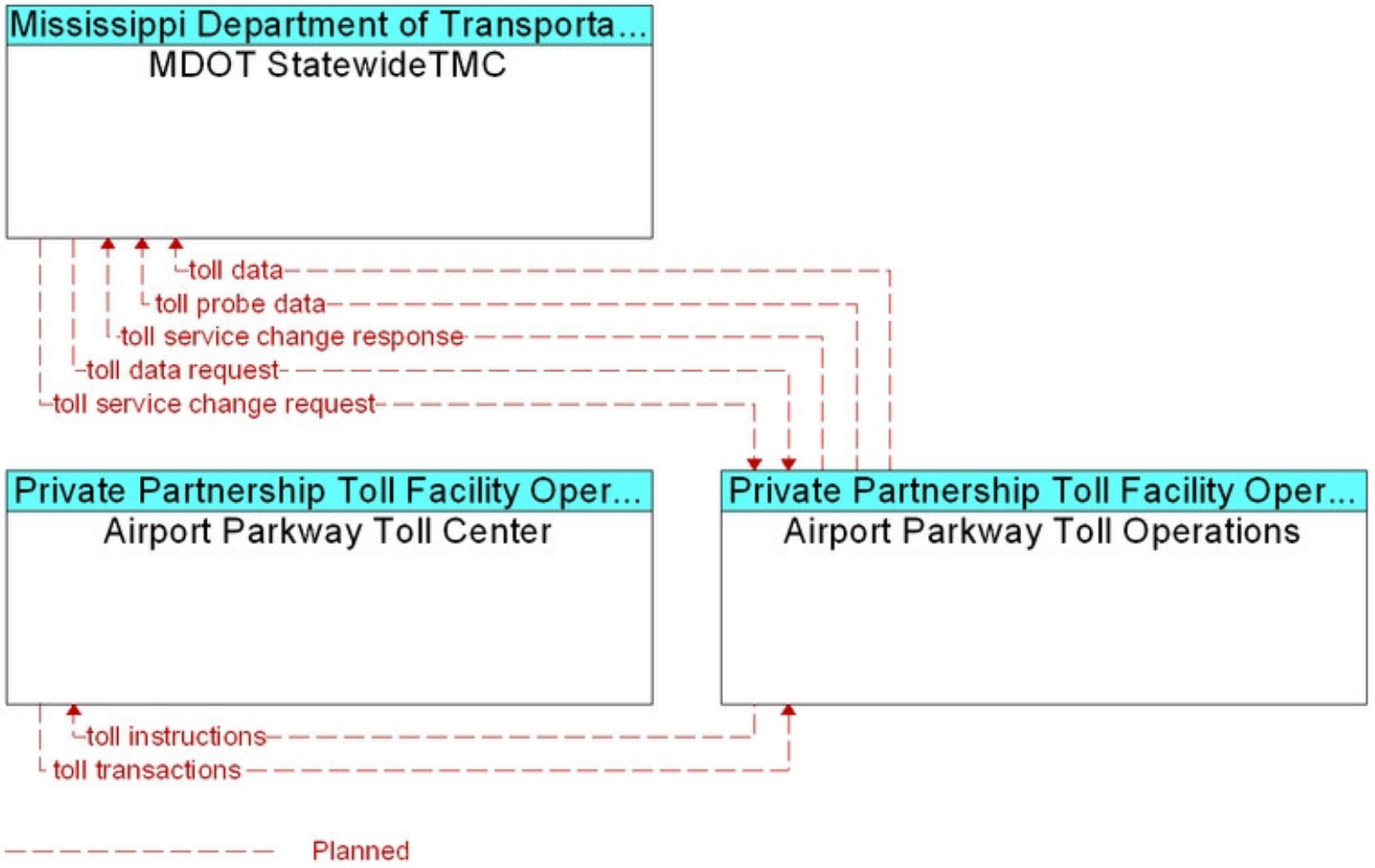
Airport Parkway Toll Center
Mississippi Department of Transporta...
MDOT StatewideTMC
Private Partnership Toll Facility Oper...
Airport Parkway Toll Operations
Planned


Mississippi Department of Transporta...
MDOT StatewideTMC
toll data
toll probe data
toll service change response
toll data request
toll service change request
Private Partnership Toll Facility Oper...
Airport Parkway Toll Center
Private Partnership Toll Facility Oper...
Airport Parkway Toll Operations
toll instructions
toll transactions
Planned

Functional Requirements
Mississippi Statewide ITS Architecture (Region)
10/31/2008 9:52:40AM

Architecture		Status
Mississippi Statewide ITS Architecture (Region)		(Region)
Element: **Airport Parkway Toll Center**		
Entity: **Toll Collection**		
Functional Area: **Toll Plaza Toll Collection** Roadside collection of tolls from vehicle toll tags and violation identification.		
Requirement:	1 The field element shall read data from vehicle toll tags to support toll payment transactions.	Planned
Requirement:	3 The field element shall update the toll tag value after debiting the toll amount and send a record of the transaction to a center.	Planned
Requirement:	4 The field element shall read the credit identity on the toll tag and send that identity and the amount to be debited to a center.	Planned
Requirement:	7 The field element shall control roadside displays indicating success or failure of the toll transaction to the driver.	Planned
Requirement:	10 The field element shall forward wide-area alert information to the Toll Operator.	Planned
Element: **Airport Parkway Toll Operations**		
Entity: **Toll Administration**		
Functional Area: **Toll Administration** Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.		
Requirement:	1 The center shall manage toll transactions, including maintaining a log of all transactions and toll pricing structure information.	Planned
Requirement:	2 The center shall dynamically price tolls based on current traffic condition information.	Planned
Requirement:	5 The center shall manage the details of toll payment violations based on tag information from the toll plaza, vehicle registration information from the Department of Motor Vehicles, invalid tag information from a Financial Institution, and previous violation information stored locally, and report such violations to appropriate law enforcement agencies.	Planned
Requirement:	10 The center shall support wide-area alerts from emergency centers by passing on the information to its toll plazas and the Toll Administrator.	Planned